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Mirth HL7 to PDF example

Quick example of taking an HL7 message, in this case lab results, and creating a PDF document out of them. Below is an example HL7 message, but keep reading if you want a simple walk through.

```
MSH|^~\&|LAB|LUCENTGLOW|||200909301135||ORU^R01||D|2.3|||
PID|1||Z000001078||DOE^JOHN||19500213|M|CA|123 STREET^KINGSPORT^TN^37660||||M||999-99-9999||||
OBR|1|1973^LAB||BMP^BASIC METABOLIC
PANEL^L|||200909301134|||||200909301134||SLOCA^STRANGE^CARL^W^^^MD|||||LAB|F||^R|||||
OBX|1|ST|GLU^GLUCOSE,RANDOM^L||100|mg/dL|74-106|N||A^S|F|||200909301134|ML^MAIN LAB^L||
OBX|2|ST|BUN^BLOOD UREA NITROGEN^L||10|mg/dL|9-20|N||A^S|F|||200909301135|ML^MAIN LAB^L||
OBX|3|ST|CRE^CREATININE^L||3.0|mg/dL|0.8-1.5|H||A^S|F|||200909301135|ML^MAIN LAB^L||
OBX|4|ST|BCRAT^BUN/CREATININE RATIO^L||1.9|RATIO|7.0-25.0|L||A^S|F|||200909301135|ML^MAIN LAB^L||
OBX|5|ST|NA^SODIUM LEVEL^L||130|mEq/L|137-145|L||A^S|F|||200909301135|ML^MAIN LAB^L||
OBX|6|ST|K^POTASSIUM LEVEL^L||3.0|mEq/L|3.5-5.1|L||A^S|F|||200909301135|ML^MAIN LAB^L||
OBX|7|ST|CL^CHLORIDE LEVEL^L||97|mEq/L|98-107|L||A^S|F|||200909301135|ML^MAIN LAB^L||
OBX|8|ST|CO2^CARBON DIOXIDE LEVEL^L||31|mEq/L|22-30|H||A^S|F|||200909301135|ML^MAIN LAB^L||
OBX|9|ST|CA^CALCIUM LEVEL^L||9.7|mg/dL|8.4-10.2|N||A^S|F|||200909301135|ML^MAIN LAB^L||
OBX|10|ST|GFR^GLOMERULAR FILTRATION RATE^L||22|ml/min|80-120|L||A^S|F|||200909301135|ML^MAIN LAB^L||
```

So, we have lab results coming to us in HL7 ORU messages. Maybe we are going to route these to a listener on our EMR, but lets say that for some reason we also want to create PDF files for results that may get printed, or faxed to a referring provider's office, etc... What we want to end up with is something that looks like the following:

Laboratory Result Report

BASIC METABOLIC PANEL

Result Date: 09/30/2009

Stage: Final

- MRN: Z000001078
- Name: DOE, JOHN
- DOB: 02/13/1950
- Address: 123 STREET KINGSPORT, TN 37660

Test	Result	Flag	Reference Range
GLUCOSE, RANDOM	100 mg/dL	N	74-106 mg/dL
BLOOD UREA NITROGEN	10 mg/dL	N	9-20 mg/dL
CREATININE	3.0 mg/dL	H	0.8-1.5 mg/dL
BUN/CREATININE RATIO	1.9 RATIO	L	7.0-25.0 RATIO
SODIUM LEVEL	130 mEq/L	L	137-145 mEq/L
POTASSIUM LEVEL	3.0 mEq/L	L	3.5-5.1 mEq/L
CHLORIDE LEVEL	97 mEq/L	L	98-107 mEq/L
CARBON DIOXIDE LEVEL	31 mEq/L	H	22-30 mEq/L
CALCIUM LEVEL	9.7 mg/dL	N	8.4-10.2 mg/dL
GLOMERULAR FILTRATION RATE	22 ml/min	L	80-120 ml/min

- Ordered By: CARL STRANGE MD
- Stage: Final

We can get there with 10 [transformer](#) steps, and a little HTML in a [Document Writer](#) destination.

First up, let's think about what the end result HTML should look like. In cases where I've needed to create a PDF file using [Mirth Connect](#), I'll create an example of the HTML by hand and then think about where pieces of data from my incoming message will live there. That said, the HTML to create the report above looks like:

<html>

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阅读排行榜

```
<body>

<div align="center">
  <h1>Laboratory Result Report</h1>
  <hr>
</div>

<h2 style="color: #990000;">BASIC METABOLIC PANEL</h2>

<h3>Result Date: 09/30/2009</h3>

<h3>Stage: Final</h3>

<ul>
  <li><u>MRN:</u> Z000001078</li>

  <li><u>Name:</u> DOE, JOHN</li>

  <li><u>DOB:</u> 02/13/1950</li>

  <li><u>Address:</u> 123 STREET KINGSPORT, TN 37660</li>
</ul>

<table border="1">
  <thead>
    <tr>
      <th colspan="2">Test</th>

      <th>Result</th>

      <th>Flag</th>

      <th>Reference Range</th>
    </tr>
  </thead>

  <tbody>
    <tr>
      <td>
        <div>
          <div>GLUCOSE,RANDOM</div>

          <div>100 mg/dL</div>

          <div>N</div>

          <div>74-106 mg/dL</div>
        </div>
      <td>
        <div>
          <div>BLOOD UREA NITROGEN</div>

          <div>10 mg/dL</div>

          <div>N</div>

          <div>9-20 mg/dL</div>
        </div>
      <td>
        
      </td>
      <td>CREATININE</td>

      <td>3.0 mg/dL</td>

      <td>H</td>

      <td>0.8-1.5 mg/dL</td>
    </tr>
  </tbody>
</table>
```

- 1. HL7传输协议(161)
- 2. 第壹課-Install: Mirth Connect 安装步骤(99)
- 3. 开篇:Mirth Connect系统集5)
- 4. HL7标准的版本(75)
- 5. 第三課: 信道学习Source C Destinations File Writer(60)

评论排行榜

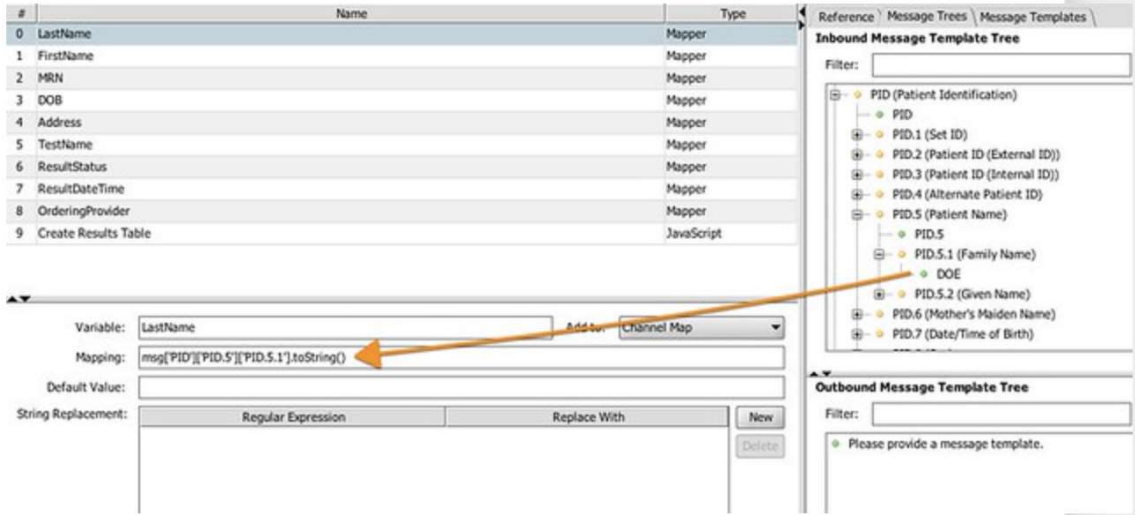
- 1. 第八課-Channel Study For R Lib(1)

```
</table>

<ul>
  <li><u>Ordered By:</u> CARL STRANGE MD</li>

  <li><u>Stage:</u> Final</li>
</ul>
</body>
</html>
```

HTML similar to that above is what needs to ultimately be in the Template of your Document Writer destination in Mirth Connect. Most of the data that we need to create our HTML can be gathered directly from our incoming HL7 message and added to the Channel Map using simple Mapper transformation steps. For example, the patient’s last name:



In fact, the only somewhat complicated thing that is going on happens in the Javascript transformer step titled "Create Results Table". In this step, we are looping over all the OBX segments contained in the incoming HL7 message to create an HTML table structured for each resultable item. Have a peek at that code here:

```
var results = new XML('<tbody></tbody>');
var tr;

for each (mOBX in msg..OBX) {

  tr = new XML('<tr></tr>');

  tr['td'][0] = "";
  if (mOBX['OBX.8']['OBX.8.1'].toString() != "N") {
    tr['td'][0]['img']['@src'] = '/mirth/graphics/flag_red.png';
  }
  // Test Name
  tr['td'][1] = mOBX['OBX.3']['OBX.3.2'].toString();
  // Result
  tr['td'][2] = mOBX['OBX.5']['OBX.5.1'].toString() + " " + mOBX['OBX.6']['OBX.6.1'].toString();
  // Flag - Red if not N = normal
  tr['td'][3] = mOBX['OBX.8']['OBX.8.1'].toString();
  // Reference range
  tr['td'][4] = mOBX['OBX.7']['OBX.7.1'].toString() + " " + mOBX['OBX.6']['OBX.6.1'].toString();

  results[""] += tr;
}

channelMap.put("Results",results);
```

Note where I’m specifying an image to be used when a resultable item is abnormal. This path is relative to the root of the drive that you have Mirth installed on. If Mirth were installed on the C drive, so the path used (/mirth/graphics/flag_red.png) would mean C:\mirth\graphics\flag_red.png.

All of the transformations are happening on the Source. So heading into the Destinations, we have 10 different pieces of data in our Channel Map ready to be used in the HTML template used by the Document Writer. The channel map variables are:

- LastName
- FirstName
- MRN
- DOB
- Address

- TestName
- ResultStatus
- ResultDateTime
- OrderingProvider
- Results

All that's left is to fill out the Document Writer destination to have our PDF files written to disk:

Connector Type: **Document Writer**

Document Writer

Directory:

File Name:

Document Type: ☒ PDF ☐ RTF

Encrypted: ☐ Yes ☒ No

Password:

Template:

```
<html>
  <div align="center"><h1>Laboratory Result Report</h1><hr /></div>

  <h2 style="color: #990000;">${TestName}</h2>

  <h3>Result Date: ${ResultDateTime}</h3>
  <h3>Stage: ${ResultStatus}</h3>

  <ul>
    <li><u>MRN:</u> ${MRN}</li>
    <li><u>Name:</u> ${LastName}, ${FirstName}</li>
    <li><u>DOB:</u> ${DOB}</li>
    <li><u>Address:</u> ${Address}</li>
  </ul>

  <table border="1">
```

Stepping through the above screen...

Directory

In my example, I'll be writing to `/mirth/results_pdf/${date.get('yyyyMMdd')}/${OrderingProvider}/`. That first bit is the file system location (adjust to your needs). The second two pieces are potentially variable depending on the message.

- `${date.get('yyyyMMdd')}` → Will append the date (as in 20160701) to the end of the specified filesystem location.
- `{OrderingProvider}` → Appends the value of the Channel Map variable OrderingProvider which we set in the Source Transformer to the end of the filesystem location.

So for our example, the complete filesystem location where the PDF will be written will be something like `/mirth/results_pdf/20160701/CARL STRANGE MD`. Please note that you will need to be sure that Mirth Connect has rights to create directories in the filesystem you specify.

File Name

The name of the file that will be written into the directory specified by *Directory*. In this example I'm using `LabResult-${SYSTIME}.pdf`. This will result in a filename similar to `LabResult-1282176369728.pdf`.

Document Type

PDF of course.

Encrypted

I have set to No, you can of course set to Yes and then specify a password on the following line.

Template

The meat of it all. First the full template I'm specifying:

```
<html>
<div align="center"><h1>Laboratory Result Report</h1><hr /></div>

<h2 style="color: #990000;">${TestName}</h2>

<h3>Result Date: ${ResultDateTime}</h3>
<h3>Stage: ${ResultStatus}</h3>

<ul>
<li><u>MRN:</u> ${MRN}</li>
<li><u>Name:</u> ${LastName}, ${FirstName}</li>
```

```
<li><u>DOB:</u> ${DOB}</li>
<li><u>Address:</u> ${Address}</li>
</ul>
```

```
<table border="1">
<thead>
<tr>
<th colspan="2">Test</th>
<th>Result</th>
<th>Flag</th>
<th>Reference Range</th>
</tr>
</thead>
</table>
${Results}
```

```
</table>

<ul>
<li><u>Ordered By:</u> ${OrderingProvider}</li>
<li><u>Stage:</u> ${ResultStatus}</li>
</ul>
</html>
```

In every spot in the above template you see something surrounded by `${}` we are substituting one of our Channel Map variables. Also, compare the above template with the final HTML output example earlier in this post to get an idea of what the channel map replacements will look like.

Notes

- This is a simple example. I’m not taking into account the potential for NTE segments in the results file. Could be added without much trouble.
- There is an assumption of one result per message (no multiple ORC segments for example).

If you haven’t had a need yet to create PDF documents using Mirth Connect, hopefully this post will give you a pointer. This should be a good starting point for anyone attempting to output PDF files from HL7 messages.

转载于: <http://theunofficialmirthadmin.blogspot.com/2016/07/mirth-hl7-to-pdf-example.html>

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