Solving for Today. Preparing for Tomorrow.

Your phone has been automatically muted. Please use the Q&A panel to ask questions during the presentation!
INTRODUCTIONS

- Ryan Hunt
- Nate Bessa
How Galen Has Utilized Mirth

- Complex Data Transformer
- Centralized Hub
- Interface Engine Alternative
AGENDA

- Overview
- Dashboard
  - Tasks
- Channels
  - Summary
  - Source
  - Destination
  - Transformer
  - Filter
  - Code Templates
- Logging
  - Searching
  - Error Handling
- Maintenance
  - Alerts
  - Events
- TouchWorks Interface Demo
  - Message Processing
Poll Question #1
Mirth Connect

- Operating System
  - Windows - XP, Vista, 7, Server
  - Linux - 2.4 kernel or newer
  - Mac - 10.X
  - [https://www.mirth.com/Downloads](https://www.mirth.com/Downloads)

- Database
  - PostgreSQL 8.3+
  - MySQL 5.0+
  - Oracle 10gR2+
  - SQL Server 2005+

- Data Types
  - Delimited Text, HL7 v 2.x, HL7 v 3.x DICOM, XML, JSON

- Connection Protocols
  - Files, TCP/MLLP, HTTP(S), FTP/SFTP, Database, Web Service, etc.
Dashboard
# Web Dashboard

- **Name:** WebCast Channel  
  - **Status:** Started  
  - **Received:** 5  
  - **Filtered:** 1  
  - **Queued:** 0  
  - **Sent:** 1  
  - **Errored:** 3

- **Name:** Inbound - Schedule Appointments  
  - **Status:** Started  
  - **Received:** 13  
  - **Filtered:** 12  
  - **Queued:** 0  
  - **Sent:** 35  
  - **Errored:** 5
## Channels

<table>
<thead>
<tr>
<th>Status</th>
<th>Device Type</th>
<th>Name</th>
<th>Id</th>
<th>Description</th>
<th>Rex A</th>
<th>Last Deployed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enabled</td>
<td>HL7 v2.x</td>
<td>Inbound - Schedule Appointments</td>
<td>5396b44be6b6-47f5-af93-008417f0b3a7</td>
<td>This channel receives...</td>
<td>0</td>
<td>2015-11-30 11:14</td>
</tr>
<tr>
<td>Disabled</td>
<td>HL7 v2.x</td>
<td>WebCast Channel</td>
<td>cadf7ed45e5f-97e8-8e073a071709</td>
<td></td>
<td>2</td>
<td>2015-11-23 18:24</td>
</tr>
</tbody>
</table>

**Channel Tasks**
- Refresh
- Replay All
- Edit Global Scripts
- Edit Code Templates
- New Channel
- Import Channel
- Export All Channels

**Other**
- Notifications (1)
- View User API
- Help
- About Mirth Connect
- Visit mirthcorp.com
- Report Issue
- Logout

2 Channels, 1 Enabled
Channels - Summary

● Channel Properties
  ▪ Name
  ▪ Data Types - Define inbound/outbound message types
  ▪ Dependencies - Associate custom libraries and code templates
  ▪ Initial State
  ▪ Attachment - extract attachments from messages

● Message Storage
● Message Pruning
● Channel Tags
● Custom Metadata
● Channel Description
Channels - Source

- **Connector Type**
  - Channel Reader
  - DICOM Listener
  - Database Reader
  - File Reader
  - HTTP Listener
  - JMS Listener
  - JavaScript Reader
  - TCP Listener
  - Web Service Listener

- **Source Settings - ACK, Batches, and Queues**

- **Connection specific settings**
Channels - Destination

- Connector Type

- Queue Settings
  - Defines when messages are to be queued
  - Advanced settings define retry counts/intervals
Channels - Scripts

- Deploy
- Undeploy
- Preprocessor
- Postprocessor
Channels - Message Templates

- **Inbound**
  - Used to analyze data from a message to set filters and create transformer steps

- **Outbound**
  - Defines the format of the outbound message. Only should be used when transforming original message from one protocol or type to another.
Channels - Filter

- Series of rules that determines routing of messages
- Created with the Rule Builder UI or JavaScript.

- Conditions
  - Exists
  - Not Exists
  - Equals
  - Not Equals
  - Contains
  - Not Contain

- Value can be a string literal or variable
Channels - Transformer

- Steps that are executed on messages in order to transform, extract, or create new messages.
- Types of Transformers
  - Mapper - Extract field data from a message and save as a variable
    - Connector - Available to later steps in the same Transformer
    - Channel - Available later in the same Channel
    - Global Channel - Available to all parts of a Channel
    - Global - Variables available to all Channels
    - Response - Variables available for ACKs in all Sources
  - Message Builder - Update values in the message
  - JavaScript - has functionality of Mapper/Message builder
  - External Script - similar to JavaScript but code is stored externally
  - XSLT Step - Converting data formats i.e. XML to plain text
Channels - Code Templates

- **User defined functions that can be used in JS based filters, transformers, and scripts**
  - Limit the amount of visible code
  - Limit instances of repeating code within Channels
  - Considered best practice

- **Configuration**
  - Library - A way to organize code templates, typically by type
  - Type
    - Function - includes function signature with drag & drop option
  - Code - JavaScript
  - Context - What components in Mirth have access to the code templates
    - Global Scripts
    - Channel Scripts
    - Source
    - Connectors
Poll Question #2
## Channel Messages

### Channel Messages - Inbound - Schedule Appointments

<table>
<thead>
<tr>
<th>Id</th>
<th>Source</th>
<th>Connector</th>
<th>Status</th>
<th>Received Date</th>
<th>Response Date</th>
<th>Errors</th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
<td>Stored Procedure: FileAppointment הסווק - Creates Appointment Type</td>
<td>SENT</td>
<td>2015-12-02 11:45:07:530</td>
<td>2015-12-02 11:45:07:546</td>
<td>--</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Stored Procedure: FileAppointment_CMS - Creates Appointment Type</td>
<td>SENT</td>
<td>2015-12-02 11:45:09:100</td>
<td>2015-12-02 11:45:09:108</td>
<td>--</td>
<td>0</td>
</tr>
</tbody>
</table>

### Messages / Mappings

- Raw
- Transformed
- Encoded
- Sent
- Response

### Status:
- ERROR

### Response:
- No patient matches found

---

Connected to: https://10.2.0.145:8443 | 11:57 AM EST (UTC-5)
# Email Alerts

## Edit Alert - Inbound Schedule Appointments Failures

### Alert Name: Inbound Schedule Appointments Failures

- **Enabled**

### Errors (select all that apply)

<table>
<thead>
<tr>
<th>Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any</td>
</tr>
<tr>
<td>Source Connector</td>
</tr>
<tr>
<td>Destination Connector</td>
</tr>
<tr>
<td>Serializer</td>
</tr>
<tr>
<td>Filter</td>
</tr>
<tr>
<td>Transformer</td>
</tr>
<tr>
<td>User Defined Transformer</td>
</tr>
<tr>
<td>Response Validation</td>
</tr>
<tr>
<td>Response Transformer</td>
</tr>
<tr>
<td>Attachment Handler</td>
</tr>
<tr>
<td>Display Script</td>
</tr>
<tr>
<td>Preprocessor Script</td>
</tr>
<tr>
<td>Postprocessor Script</td>
</tr>
<tr>
<td>Underlying Script</td>
</tr>
</tbody>
</table>

### Channels

<table>
<thead>
<tr>
<th>Filter</th>
</tr>
</thead>
<tbody>
<tr>
<td>[New Channels]</td>
</tr>
<tr>
<td>Inbound - Schedule Appointments</td>
</tr>
<tr>
<td>Inbound - SUNquest DLU Switches</td>
</tr>
<tr>
<td>Inbound - SUNquest Results</td>
</tr>
<tr>
<td>Outbound - SUNquest Lab Order</td>
</tr>
</tbody>
</table>

### Actions

#### Protocol

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Recipient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email</td>
<td><a href="mailto:role_name@galenhealthcare.com">role_name@galenhealthcare.com</a></td>
</tr>
</tbody>
</table>

#### Subject (only used for email messages)

```
At $\{date\}, a message processed by the $\{channelName\} channel failed with the error message $\{errorMessage\}.
```

### Alert Variables

- globalName
- variable
- date
- systemTime
- error
- errorMessage
- channelName
- connectorName
- connectorType
- messageID

---

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# Event Logs

<table>
<thead>
<tr>
<th>Level</th>
<th>Date &amp; Time</th>
<th>Name</th>
<th>Server ID</th>
<th>User</th>
<th>Outcome</th>
<th>IP Addr</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2015-11-23 13:28:05:38</td>
<td>Get server settings</td>
<td>941c9d0-c0af-4c7b-b7e4-0edd2a4e547c</td>
<td>5 (nate.bessa)</td>
<td>✔</td>
<td>10.2.0.145</td>
</tr>
<tr>
<td>2</td>
<td>2015-11-23 13:28:00:30</td>
<td>Update alerts</td>
<td>941c9d0-c0af-4c7b-b7e4-0edd2a4e547c</td>
<td>5 (nate.bessa)</td>
<td>✔</td>
<td>10.2.0.145</td>
</tr>
<tr>
<td>3</td>
<td>2015-11-23 13:24:05:50</td>
<td>Update alerts</td>
<td>941c9d0-c0af-4c7b-b7e4-0edd2a4e547c</td>
<td>5 (nate.bessa)</td>
<td>✔</td>
<td>10.2.0.145</td>
</tr>
<tr>
<td>4</td>
<td>2015-11-23 13:24:00:70</td>
<td>Get server settings</td>
<td>941c9d0-c0af-4c7b-b7e4-0edd2a4e547c</td>
<td>5 (nate.bessa)</td>
<td>✔</td>
<td>10.2.0.145</td>
</tr>
<tr>
<td>5</td>
<td>2015-11-23 13:23:04:70</td>
<td>Get alert info</td>
<td>941c9d0-c0af-4c7b-b7e4-0edd2a4e547c</td>
<td>5 (nate.bessa)</td>
<td>✔</td>
<td>10.2.0.145</td>
</tr>
<tr>
<td>6</td>
<td>2015-11-23 13:21:10:48</td>
<td>Update channel</td>
<td>941c9d0-c0af-4c7b-b7e4-0edd2a4e547c</td>
<td>5 (nate.bessa)</td>
<td>✔</td>
<td>10.2.0.145</td>
</tr>
<tr>
<td>7</td>
<td>2015-11-23 13:20:03:08</td>
<td>Data Pruner</td>
<td>941c9d0-c0af-4c7b-b7e4-0edd2a4e547c</td>
<td>5 (nate.bessa)</td>
<td>✔</td>
<td>10.2.0.145</td>
</tr>
<tr>
<td>8</td>
<td>2015-11-23 13:21:54:721</td>
<td>Get messages by page limit</td>
<td>941c9d0-c0af-4c7b-b7e4-0edd2a4e547c</td>
<td>1 (admin)</td>
<td>✔</td>
<td>10.3.2.19</td>
</tr>
<tr>
<td>9</td>
<td>2015-11-23 12:51:51:71</td>
<td>Get messages by page limit</td>
<td>941c9d0-c0af-4c7b-b7e4-0edd2a4e547c</td>
<td>1 (admin)</td>
<td>✔</td>
<td>10.3.2.19</td>
</tr>
<tr>
<td>10</td>
<td>2015-11-23 12:47:41:900</td>
<td>Get message content</td>
<td>941c9d0-c0af-4c7b-b7e4-0edd2a4e547c</td>
<td>1 (admin)</td>
<td>✔</td>
<td>10.3.2.19</td>
</tr>
<tr>
<td>11</td>
<td>2015-11-23 12:47:31:393</td>
<td>Get messages by page limit</td>
<td>941c9d0-c0af-4c7b-b7e4-0edd2a4e547c</td>
<td>1 (admin)</td>
<td>✔</td>
<td>10.3.2.19</td>
</tr>
<tr>
<td>12</td>
<td>2015-11-23 12:02:39:857</td>
<td>Get messages by page limit</td>
<td>941c9d0-c0af-4c7b-b7e4-0edd2a4e547c</td>
<td>5 (nate.bessa)</td>
<td>✔</td>
<td>10.2.0.145</td>
</tr>
<tr>
<td>13</td>
<td>2015-11-23 12:02:27:639</td>
<td>Get message content</td>
<td>941c9d0-c0af-4c7b-b7e4-0edd2a4e547c</td>
<td>5 (nate.bessa)</td>
<td>✔</td>
<td>10.2.0.145</td>
</tr>
<tr>
<td>14</td>
<td>2015-11-23 12:02:21:949</td>
<td>Get messages by page limit</td>
<td>941c9d0-c0af-4c7b-b7e4-0edd2a4e547c</td>
<td>5 (nate.bessa)</td>
<td>✔</td>
<td>10.2.0.145</td>
</tr>
<tr>
<td>15</td>
<td>2015-11-23 12:02:20:965</td>
<td>Reprocess messages</td>
<td>941c9d0-c0af-4c7b-b7e4-0edd2a4e547c</td>
<td>5 (nate.bessa)</td>
<td>✔</td>
<td>10.2.0.145</td>
</tr>
<tr>
<td>16</td>
<td>2015-11-23 12:02:16:004</td>
<td>Get message content</td>
<td>941c9d0-c0af-4c7b-b7e4-0edd2a4e547c</td>
<td>5 (nate.bessa)</td>
<td>✔</td>
<td>10.2.0.145</td>
</tr>
<tr>
<td>17</td>
<td>2015-11-23 12:02:00:000</td>
<td>Data Pruner</td>
<td>941c9d0-c0af-4c7b-b7e4-0edd2a4e547c</td>
<td>0 (system)</td>
<td>✔</td>
<td>10.3.2.19</td>
</tr>
<tr>
<td>18</td>
<td>2015-11-23 11:35:14:009</td>
<td>Get server settings</td>
<td>941c9d0-c0af-4c7b-b7e4-0edd2a4e547c</td>
<td>1 (admin)</td>
<td>✔</td>
<td>10.3.2.19</td>
</tr>
<tr>
<td>19</td>
<td>2015-11-23 11:35:05:925</td>
<td>Get status invoked through Data...</td>
<td>941c9d0-c0af-4c7b-b7e4-0edd2a4e547c</td>
<td>1 (admin)</td>
<td>✔</td>
<td>10.3.2.19</td>
</tr>
</tbody>
</table>

**Filter**

- `channelId`: MessageFilter[MessageId=17, messageId=None, originalIdlePer=<null>, originalActivationId=<null>], channelId=534044c-9b52-475f-a03-0844f8b5647
Message Pruning and Archival
Poll Question #3
TouchWorks Interface Demo

HL7 → Mirth → EHR
Mirth Connect

- Flexible and accessible
- Most features come free
- Large online community
- Galen is ready to provide additional assistance
  - Mirth development for an existing installation
  - Migration from your current interface engine
Thank you for joining us today.

To access the slides from today’s presentation, as well as our past webcasts, please visit:

http://wiki.galenhealthcare.com/Category:Webcasts

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