Soup to Nuts: Data Repository 101

2015 MUSE International
Session #701
Tuesday May 26th 9:30am – 12:00pm
Presenter: Ian Proffer
Today’s Agenda

• Data Repository Overview
• Operational Management
• Data Validation & Auditing
• Microsoft SQL Server & Management Studio
• Report Presentation Options
Introductions

• A little bit about me and Acmeware
• Tell me about you
• Tell me about your Data Repository
Data Repository Overview
What is the Data Repository?

• For starters, it’s a big database
  ▪ Most BI architects would call it a data warehouse
• A relational database...sort of
  ▪ Database table structure is dictated by the MEDITECH applications’ hierarchical database design (e.g., ADM.PAT, BAR.BCH, LAB.SPEC, etc.)
  ▪ It has minimal metadata (i.e., data about data – where did this data come from?)
  ▪ Business rules are maintained in MEDITECH (no foreign keys or DRI in the database)
Why Use the Data Repository?

Or...why shouldn’t I use NPR/Report Designer?

- DR was originally developed as a decision support platform
  - Ideal for retrospective aggregate reporting
- As MEDITECH has evolved, so has the DR
  - Near real-time data latency allows for clinical, patient-centric reports too
Data Repository Benefits

• SQL recordsets can be used for both detail and summary reports
  ▪ Meaningful Use measures
  ▪ Inpatient census → patient account details → Lab test results
• Cross-module reporting is easy
  ▪ Show patient demographic info from ABS/ADM/BAR along with all diagnoses, pharmacy drug administrations, clinical documentation
• Retrieving data from SQL is fast – forget about waiting for the report to compile
  ▪ Writing efficient queries is key
  ▪ Create your own indexes for even better performance
• Develop datamarts to feed web applications or data extracts to other systems
• DR is not affected by MEDITECH application downtime
  ▪ Great resource for critical reports when MEDITECH is offline (eMAR, Inpatient Order Summary, etc.)
DR Components

- MEDITECH DR data extraction code (automated “hooks”) are present in every application module (ABS, ADM, BAR, etc.)
- MEDITECH Data Repository application module
- DR Manager application (a Windows server-based component)
- SQL Server Databases
- The DR has a lot of potential but requires client report and/or application development to provide end-user value
DR Component Schematic – MAGIC & C/S

- ADM
  - Filer Triggers
  - DR Queue

- B/AR
  - Filer Triggers
  - DR Queue

- LAB
  - Filer Triggers
  - DR Queue

- OE
  - Filer Triggers
  - DR Queue

Microsoft SQL Server

- livedb database
  - ADM Tables
  - BAR Tables
  - LAB Tables
  - OE Tables
DR Component Schematic – 6.x

- ADM
  - Filer Triggers
  - DR Queue
- B/AR
  - Filer Triggers
  - DR Queue
- PCS
  - Filer Triggers
  - DR Queue
- OM
  - Filer Triggers
  - DR Queue

DR Module

NPR

Microsoft SQL Server
- livendb database
  - ADM Tables
  - BAR Tables
- livefadb database
  - PCS Tables
  - OM Tables

DR Manager
Important DR Terminology

• Core tables
  ▪ What tables will you use for reporting?
  ▪ Now...with ARRA/Meaningful Use flavors!

• Enabled for transfer
  ▪ Which tables will receive regular, ongoing updates?

• Initial loads
  ▪ How are new tables initialized or existing data discrepancies resolved?
Comparing Data Repository and NPR

Comparing NPR to DR

Certain objects in MEDITECH NPR correspond to objects in the Data Repository (DR).

For example:

<table>
<thead>
<tr>
<th>NPR Components</th>
<th>Data Repository</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPMs and segments</td>
<td>DR Tables</td>
</tr>
<tr>
<td>ADM.PAT</td>
<td>AdmVisits, AdmittingData, AdmDischarge, etc.</td>
</tr>
<tr>
<td>OE.ORD.main</td>
<td>OeOrders</td>
</tr>
<tr>
<td>Elements</td>
<td>DR Columns</td>
</tr>
<tr>
<td>URNs</td>
<td>Primary Keys (AdmVisits.VisitID)</td>
</tr>
</tbody>
</table>

Each NPR DPM may be associated with multiple DR tables. Also, each NPR element corresponds to a specific DR column.

Data segments versus relational table structures

The fundamental difference in the way data is stored in the MEDITECH applications and in the DR SQL Database is that the MEDITECH NPR elements are stored in a hierarchical format whereas the data in the Data Repository is stored in a relational format. In general, there is one Data...
Operational Management
The MEDITECH DR Module
The MEDITECH DR Module

• Monitoring DR transfer activity
• Reviewing DR errors
• Logging service issues/tasks with MEDITECH
DR Main Menu – 6.x (M/AT)

- Table and field info; mapping to NPR
- Operations: transfers, errors, pending rows
- Automated maintenance
DR Main Menu – Client/Server

[Image of the DR Main Menu interface]
DR Main Menu – MAGIC

- Operations View
  10. Transfer Status
  11. Initial Load Status
  12. DR Exceptions
  13. DR Errors
  14. Pending Activity
  15. FM Status
  16. View Database Logs

- Operations List
  20. Transfer Schedule
  21. Transfer Status
  22. FM Status
  23. Initial Load Status
  24. Pending Activity
  25. Transfer Stats By Date
  26. Transfer Stats By Table
  27. Initial Load Audit Trail

- Reporting
  30. Report Menu
  31. Field Inquiry
  32. Report Initialization
  33. View Table

- Enter/Edit
  40. Enter/Edit IL Status

User: PROFIA  *LIVE*
Operations Desktop – 6.x NPR
Operations Desktop – 6.x M/AT

View DR Monitor Status

<table>
<thead>
<tr>
<th>DR Monitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job</td>
</tr>
<tr>
<td>Status</td>
</tr>
</tbody>
</table>

File Maintenance

<table>
<thead>
<tr>
<th>Status</th>
<th>Completed – 05/04/14 2:00 am</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job Number</td>
<td></td>
</tr>
<tr>
<td>Switch</td>
<td>On</td>
</tr>
<tr>
<td>Last Start</td>
<td>05/04/14 2:00 am</td>
</tr>
<tr>
<td>Last Finish</td>
<td>05/04/14 2:00 am</td>
</tr>
<tr>
<td>DrManager Last Sent</td>
<td>05/04/14 2:00 am</td>
</tr>
</tbody>
</table>

File Maintenance By Component

<table>
<thead>
<tr>
<th>Component</th>
<th>Last Start</th>
<th>Last Finish</th>
<th>Status</th>
<th>Switch</th>
<th>Purge Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity</td>
<td>05/04/14 2:00 am</td>
<td>05/04/14 2:00 am</td>
<td>Finished [purged 18 of 268]</td>
<td>On</td>
<td>14</td>
</tr>
<tr>
<td>Errors</td>
<td>05/04/14 2:00 am</td>
<td>05/04/14 2:00 am</td>
<td>Finished [purged 1 of 9]</td>
<td>On</td>
<td>7</td>
</tr>
<tr>
<td>Exceptions</td>
<td>05/04/14 2:00 am</td>
<td>05/04/14 2:00 am</td>
<td>Finished [purged 1 of 8]</td>
<td>On</td>
<td>7</td>
</tr>
<tr>
<td>Audits</td>
<td>05/04/14 2:00 am</td>
<td>05/04/14 2:00 am</td>
<td>Finished [purged 24 of 366]</td>
<td>On</td>
<td>14</td>
</tr>
<tr>
<td>Specials</td>
<td>05/04/14 2:00 am</td>
<td>05/04/14 2:00 am</td>
<td>Finished [purged 0 of 5]</td>
<td>On</td>
<td>14</td>
</tr>
<tr>
<td>Validations</td>
<td>05/04/14 2:00 am</td>
<td>05/04/14 2:00 am</td>
<td>Finished [purged 0 of 0]</td>
<td>On</td>
<td>14</td>
</tr>
<tr>
<td>FileMaint</td>
<td>05/04/14 2:00 am</td>
<td>05/04/14 2:00 am</td>
<td>Finished [purged 0 of 0]</td>
<td>On</td>
<td>5</td>
</tr>
</tbody>
</table>
Background Transfers

• What do they do?
  - Background jobs monitor MEDITECH applications and send new or updated data to Data Repository tables

• Who manages them?
  - Your staff are responsible for monitoring
  - MEDITECH typically gets involved when jobs are not running properly
Transfer Activity/Background Jobs

Operations Desktop
Table Inquiry
Field Inquiry
Table Reports

Data Transfer
View Errors
View Exceptions
View Database Logs
File Maintenance
Report Initialization
Initial Load

Enter/Edit Background Job
View Master/Transfer Background Status
Print Status
View Pending Activity
Edit Batch Schedule
Edit Continuous Mode Schedule
List Transfer Schedules
View Transfer Schedules

Status Information

<table>
<thead>
<tr>
<th>Transfer</th>
<th>State</th>
<th>Hang</th>
<th>Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEH.LIVEN,ABS.BEH</td>
<td>Running</td>
<td>30-300</td>
<td></td>
</tr>
<tr>
<td>BEH.LIVEN,ADM.BEH</td>
<td>Running</td>
<td>30-300</td>
<td></td>
</tr>
<tr>
<td>BEH.LIVEN,AP.BEH</td>
<td>Running</td>
<td>30-300</td>
<td></td>
</tr>
<tr>
<td>BEH.LIVEN,BAR.BEH</td>
<td>Running</td>
<td>30-300</td>
<td></td>
</tr>
<tr>
<td>BEH.LIVEN,DR</td>
<td>Running</td>
<td>30-300</td>
<td></td>
</tr>
</tbody>
</table>
Transfer Activity/Background Jobs

### M-AT Status of DR Activity Jobs

**From Activity Date**: 05/20/15

<table>
<thead>
<tr>
<th>Job</th>
<th>Type</th>
<th>Sleep</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARM</td>
<td>Application</td>
<td>10</td>
<td>5/100000</td>
</tr>
<tr>
<td>DR</td>
<td>Application</td>
<td>10</td>
<td>5/100000</td>
</tr>
<tr>
<td>EDM</td>
<td>Application</td>
<td>10</td>
<td>5/100000</td>
</tr>
<tr>
<td>EMR</td>
<td>Application</td>
<td>10</td>
<td>5/100000</td>
</tr>
<tr>
<td>HIM</td>
<td>Application</td>
<td>10</td>
<td>5/100000</td>
</tr>
<tr>
<td>MIS</td>
<td>Application</td>
<td>10</td>
<td>5/100000</td>
</tr>
<tr>
<td>OM</td>
<td>Application</td>
<td>10</td>
<td>5/100000</td>
</tr>
<tr>
<td>PCS</td>
<td>Application</td>
<td>10</td>
<td>5/100000</td>
</tr>
<tr>
<td>PHM</td>
<td>Application</td>
<td>10</td>
<td>5/100000</td>
</tr>
<tr>
<td>REG</td>
<td>Application</td>
<td>10</td>
<td>5/100000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Job Number</th>
<th>Folder</th>
<th>Status</th>
<th>Minutes Behind</th>
<th>Bytes Behind</th>
</tr>
</thead>
<tbody>
<tr>
<td>9230305</td>
<td>APP-REG-0</td>
<td>Idling</td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>
Monitoring/Maintaining Background Jobs

• Background jobs can be running without tables getting properly updated
• Look for any status that indicates activity
  ▪ (Running, sleeping, etc.)
  ▪ Halted, crashed, unknown – these statuses require intervention
• Do not reboot server without stopping jobs (completely)
Adding Background Jobs

- Why create additional background jobs? (Current job is taking too long to update the DR tables.)
- You can split larger applications into multiple jobs (e.g. BAR).
- You can segment off particular tables that are used for real time reporting.

* The ability to have additional transfer jobs depends on your current ring release
## Operations – DR Pending Activity

Pending Activity for Beverly Hospital PHA *LIVE NPR* database(s)

<table>
<thead>
<tr>
<th>Application and Table Name</th>
<th>Rows</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHA.BEH .TmpOpIC</td>
<td>1733</td>
</tr>
<tr>
<td>PHA.BEH DPhaChargeFormula</td>
<td>2</td>
</tr>
<tr>
<td>PHA.BEH DPhaInventoryDrugs</td>
<td>50</td>
</tr>
<tr>
<td>PHA.BEH DPhaInventoryLevels</td>
<td>102</td>
</tr>
<tr>
<td>PHA.BEH DPhaInventoryLocations</td>
<td>50</td>
</tr>
<tr>
<td>PHA.BEH PhaInterven</td>
<td>6</td>
</tr>
<tr>
<td>PHA.BEH PhaIntervenAudit</td>
<td>6</td>
</tr>
<tr>
<td>PHA.BEH PhaIntervenBilling</td>
<td>6</td>
</tr>
<tr>
<td>PHA.BEH PhaIntervenStaffMembers</td>
<td>6</td>
</tr>
<tr>
<td>PHA.BEH PhaIntervenWorkload</td>
<td>5</td>
</tr>
<tr>
<td>PHA.BEH PhaPatBatchMessages</td>
<td>749</td>
</tr>
<tr>
<td>PHA.BEH PhaPatCartLabelX</td>
<td>1</td>
</tr>
<tr>
<td>PHA.BEH PhaPatData</td>
<td>50</td>
</tr>
<tr>
<td>PHA.BEH PhaRx</td>
<td>789</td>
</tr>
<tr>
<td>PHA.BEH PhaRxAdditivesTpn</td>
<td>773</td>
</tr>
<tr>
<td>PHA.BEH PhaRxAdjustDoseAdminTimes</td>
<td>777</td>
</tr>
<tr>
<td>PHA.BEH PhaRxAdminDateTimeX</td>
<td>21</td>
</tr>
<tr>
<td>PHA.BEH PhaRxAdminLog</td>
<td>16</td>
</tr>
<tr>
<td>PHA.BEH PhaRxAdminLogNewCmtsText</td>
<td>16</td>
</tr>
<tr>
<td>PHA.BEH PhaRxAdminLogNewQueriesCs</td>
<td>35</td>
</tr>
</tbody>
</table>
### DR Server Maintenance

<table>
<thead>
<tr>
<th>Starts at</th>
<th>Server</th>
<th>Last Start</th>
<th>Last Finish</th>
</tr>
</thead>
<tbody>
<tr>
<td>000</td>
<td>NMN-DR01</td>
<td>05/04/14 0301</td>
<td>05/04/14 0301</td>
</tr>
</tbody>
</table>

### DR File Maintenance

<table>
<thead>
<tr>
<th>Application</th>
<th>Last Start</th>
<th>Last Finish</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABS.NMC</td>
<td>05/04/14 0201</td>
<td>05/04/14 0243</td>
<td>Completed</td>
</tr>
<tr>
<td>ADM.NMC</td>
<td>05/04/14 0243</td>
<td>05/04/14 0306</td>
<td>Completed</td>
</tr>
<tr>
<td>AP.NMC</td>
<td>05/04/14 0306</td>
<td>05/04/14 0307</td>
<td>Completed</td>
</tr>
<tr>
<td>ARM.NMC</td>
<td>05/04/14 0307</td>
<td>05/04/14 0307</td>
<td>Completed</td>
</tr>
<tr>
<td>BAR.NMC</td>
<td>05/04/14 0307</td>
<td>05/04/14 0342</td>
<td>Completed</td>
</tr>
<tr>
<td>DR</td>
<td>05/04/14 0342</td>
<td>05/04/14 0342</td>
<td>Completed</td>
</tr>
<tr>
<td>FA.NMC</td>
<td>05/04/14 0342</td>
<td>05/04/14 0342</td>
<td>Completed</td>
</tr>
<tr>
<td>GL</td>
<td>05/04/14 0342</td>
<td>05/04/14 0342</td>
<td>Completed</td>
</tr>
<tr>
<td>LAB.NMC</td>
<td>05/04/14 0342</td>
<td>05/04/14 0346</td>
<td>Completed</td>
</tr>
<tr>
<td>MIS</td>
<td>05/04/14 0346</td>
<td>05/04/14 0353</td>
<td>Completed</td>
</tr>
<tr>
<td>MM.NMC</td>
<td>05/04/14 0353</td>
<td>05/04/14 0353</td>
<td>Completed</td>
</tr>
<tr>
<td>MM.PHANMC</td>
<td>05/04/14 0353</td>
<td>05/04/14 0353</td>
<td>Completed</td>
</tr>
<tr>
<td>MRI.NMC</td>
<td>05/04/14 0353</td>
<td>05/04/14 0414</td>
<td>Completed</td>
</tr>
<tr>
<td>PHA.NMC</td>
<td>05/04/14 0414</td>
<td>05/04/14 0435</td>
<td>Completed</td>
</tr>
<tr>
<td>RAD.NMC</td>
<td>05/04/14 0435</td>
<td>05/04/14 0445</td>
<td>Completed</td>
</tr>
<tr>
<td>SCH.NMC</td>
<td>05/04/14 0445</td>
<td>05/04/14 0455</td>
<td>Completed</td>
</tr>
</tbody>
</table>
Initial Loads

• What do they do?
   Special background jobs used to initialize DR tables with all available data from the parent MEDITECH DPM, segment or element

• Who manages them?
   Your staff are responsible for monitoring
   Only MEDITECH can start and maintain initial loads
Useful monitoring of table loads during ring releases or MEDITECH table fixes
# Operations – Initial Load Status

<table>
<thead>
<tr>
<th>Database</th>
<th>Idle</th>
<th>Started</th>
<th>Finished</th>
<th>Duration</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABS.NMC</td>
<td>04/15/14 1443</td>
<td>04/16/14 0723</td>
<td>16H 40M</td>
<td>Finished</td>
<td></td>
</tr>
<tr>
<td>ADM.NMC</td>
<td>04/15/14 1442</td>
<td></td>
<td></td>
<td></td>
<td>Stopped</td>
</tr>
<tr>
<td>AP.NMC</td>
<td>04/29/11 1334</td>
<td>04/29/11 1358</td>
<td>24M</td>
<td>Finished</td>
<td></td>
</tr>
<tr>
<td>ARM.NMC</td>
<td>05/25/11 1414</td>
<td>05/25/11 1414</td>
<td>0M</td>
<td>Finished</td>
<td></td>
</tr>
<tr>
<td>BAR.NMC</td>
<td>03/26/13 1537</td>
<td>03/27/13 2343</td>
<td>1D 8H 6M</td>
<td>Finished</td>
<td></td>
</tr>
<tr>
<td>DR</td>
<td>04/15/14 1442</td>
<td>04/15/14 1449</td>
<td>7M</td>
<td>Finished</td>
<td></td>
</tr>
<tr>
<td>FA.NMC</td>
<td>04/29/11 1202</td>
<td>04/29/11 1202</td>
<td>0M</td>
<td>Finished</td>
<td></td>
</tr>
<tr>
<td>GL</td>
<td>04/29/11 1216</td>
<td>04/29/11 1250</td>
<td>34M</td>
<td>Finished</td>
<td></td>
</tr>
<tr>
<td>LAB.NMC</td>
<td>04/16/14 1139</td>
<td>04/16/14 1156</td>
<td>17M</td>
<td>Finished</td>
<td></td>
</tr>
<tr>
<td>MIS</td>
<td>04/15/14 1453</td>
<td>04/15/14 1548</td>
<td>55M</td>
<td>Finished</td>
<td></td>
</tr>
<tr>
<td>MM.NMC</td>
<td>09/04/13 1517</td>
<td>09/04/13 1550</td>
<td>33M</td>
<td>Finished</td>
<td></td>
</tr>
<tr>
<td>MM.PHANMC</td>
<td>05/12/11 0756</td>
<td>05/12/11 0756</td>
<td>0M</td>
<td>Finished</td>
<td></td>
</tr>
<tr>
<td>MRI.NMC</td>
<td>05/26/11 1459</td>
<td>05/26/11 1501</td>
<td>2M</td>
<td>Finished</td>
<td></td>
</tr>
<tr>
<td>PHA.NMC</td>
<td>04/23/14 0819</td>
<td>04/23/14 1317</td>
<td>4H 58M</td>
<td>Finished</td>
<td></td>
</tr>
<tr>
<td>RAD.NMC</td>
<td>04/01/14 1640</td>
<td>04/02/14 0115</td>
<td>8H 35M</td>
<td>Finished</td>
<td></td>
</tr>
<tr>
<td>SCH.NMC</td>
<td>04/01/14 1640</td>
<td>04/01/14 1757</td>
<td>1H 17M</td>
<td>Finished</td>
<td></td>
</tr>
</tbody>
</table>

**Job Number**

**Status Msg** Finished with 10 Table errors
Dealing with DR Errors

• Monitoring for recurring or one-time errors
• DR Parameters that affect error diagnosis
  ▪ Activity index days
  ▪ Error log days
• Reporting errors to MEDITECH
DR Parameters

Activity Days (typically set to 7-10): Determines how long activity remains in an index to be transferred to DR.

Error Log Days (default is 3): we recommend increasing this to 7-10 days.
A summary of recently logged errors within DR; it can be downloaded to a file for regular or automated review.
## Operations - DR Errors (M/AT)

### Summary

<table>
<thead>
<tr>
<th>Application</th>
<th>Fatal</th>
<th>Non Fatal</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIS</td>
<td>0</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>DR</td>
<td>18</td>
<td>3</td>
<td>21</td>
</tr>
<tr>
<td>REG</td>
<td>0</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>OM</td>
<td>0</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>EMR</td>
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<td>5</td>
</tr>
<tr>
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<td>0</td>
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<td>PCS</td>
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Totals: 18 | 67

### Detailed View

<table>
<thead>
<tr>
<th>Date/Time</th>
<th>Type</th>
<th>Message Text</th>
<th>Source</th>
<th>Appl</th>
<th>Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>03/13/12 18:31</td>
<td>RKFN</td>
<td>RegForm_DischReferrals_DischReferralNote-Primary Key Format</td>
<td>Data Xfer</td>
<td>REG</td>
<td>36</td>
</tr>
<tr>
<td>03/13/12 18:31</td>
<td>RKFN</td>
<td>RegForm_DischReferrals_DischReferralAddress-Primary Key Format</td>
<td>Data Xfer</td>
<td>REG</td>
<td>36</td>
</tr>
<tr>
<td>03/13/12 18:31</td>
<td>RKFN</td>
<td>RegForm_DischReferrals_DischReferralNotePlain-Primary Key Format</td>
<td>Data Xfer</td>
<td>REG</td>
<td>45</td>
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<td>03/13/12 17:00</td>
<td>RSRR</td>
<td>RegAcctQuery_Result-DR Manager Return Non-Fatal</td>
<td>Data Xfer</td>
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<td>68</td>
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<td>02/20/12 07:39</td>
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<td>Data Xfer</td>
<td>REG</td>
<td>2137</td>
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<tr>
<td>02/20/12 07:39</td>
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<td>RegForm_DischForms_Queries-Primary Key Format</td>
<td>Data Xfer</td>
<td>REG</td>
<td>17490</td>
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<tr>
<td>02/20/12 00:57</td>
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<td>RegAcct_Providers-Primary Key Format</td>
<td>Data Xfer</td>
<td>REG</td>
<td>1702</td>
</tr>
<tr>
<td>02/13/12 21:04</td>
<td>RKFN</td>
<td>RegForm_DischForms_QueriesMulti-Primary Key Format</td>
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<td>REG</td>
<td>1591</td>
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<td>REG</td>
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<tr>
<td>06/24/11 15:00</td>
<td>RKFN</td>
<td>RegAcct_OtherProviders-Primary Key Format</td>
<td>Data Xfer</td>
<td>REG</td>
<td>3</td>
</tr>
<tr>
<td>06/18/11 11:12</td>
<td>RCTN</td>
<td>RegAcct.DataFile-Time Stamp Not Found in Data File</td>
<td>Data Xfer</td>
<td>REG</td>
<td>1</td>
</tr>
</tbody>
</table>

### Scope

<table>
<thead>
<tr>
<th>Type</th>
<th>Fatal</th>
<th>Non Fatal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Row</td>
<td>0</td>
<td>29</td>
</tr>
<tr>
<td>File</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Table: RegForm_DischReferrals_DischReferralNote
Object: RegForm
Last RID: {x0-20120319111441893|P|DR. YOUNG GRACE 714776-2100}
Operations – Download Errors to File

```
DATE: 02/20/13 @ 1127  DR *LIVE*
USER:            Error Log Summary
Page 1

Date: 02/20/13     Time: 1113
Table: DRGDIAG     AbsDrgDiagnoses
Sequence:          SourceID:
Program: DrCapture[ABS.PAT.filer]
App DB: ABS.UCH     NPR DPM: ABS.PAT
Type: PR (Program error)
Element:           Expected:
Errored Value: ABS.UCH

Hits: 1680
Row: ZDZ 2848351 D D X
Message: Missing Subscript at position 1 in activity for ABS.PAT.xls
```
Determining Which Errors to Report

• How often is the error occurring? (Just once or repeatedly?)
• Does the error affect the SQL database?
  ▪ Many errors are logged from MEDITECH, but do not affect the DR
• Is the error a symptom of a wider system problem?
  ▪ Network down, server rebooted, etc.
• Only report errors that reference tables that are active (receiving data) and used for reports
• For errors that occur repeatedly, only provide the latest example to MEDITECH
• “Skipped Activity” messages should be reported immediately
DR Error Examples

Example not to report:

DATE: 20110414    TIME: 0001
TABLE: LACSAX1 LabSpecAlerts
Sequence:        
SOURCEID: OSC    MIS DB: OSC
PROGRAM: DrXferBkg[K]
APPL DB: SCH.SSM  DPM: LAB.C.SPEC
TYPE: PM        Socket
ELEMENT:        
EXPECTED:       
ERROR VALUE:    

ROW:            
MESSAGE: SCH.SSM's LabSpecAlerts expander is missing

Example to report:

DATE: 20110221    TIME: 1143
TABLE: VISITCLI AdmVisitClinicalQueries
Sequence: 4391
SOURCEID: OSC    MIS DB: OSC
PROGRAM: DrXferBkg[T:ADMQUERY]
APPL DB: ADM.OSC  DPM: ADM.PAT
TYPE: S          Socket
ELEMENT: SQL     
EXPECTED:       
ERROR VALUE:    

ROW: 873550 MIO5UD Y 1
MESSAGE: Primary key VisitID is missing

This is typically not a table used for reports

Key items when reviewing errors
DR Error Messages

- Messages that don’t typically require action
  MESSAGE: Unable to open prefixes to ADM.OSH database
  MESSAGE: Missing subscript at position 0 for OE.STAT.transcription.stats
  MESSAGE: Violation of PRIMARY KEY constraint 'mtpk_ep551386'. Cannot insert duplicate key in object 'DMisUserC~. Check Server Error Log for more info SQL Non Fatal Error
  MESSAGE: Line 1: Incorrect syntax near '{'.. Check Server Error Log for more info SQL NonFatal Error
  MESSAGE: Unable to find segment from physical [No prefix for segment [Physical.] and nil in @.db]
  MESSAGE: No pointer for include children of AP.AHS.TmpOpIC table
  MESSAGE: CON DR Server not responding to ECB command - ACK 98 SQL Fatal Error
  MESSAGE: DR Server not responding to ECB command

- Messages you should report to MEDITECH
  MESSAGE: AdmVitalSigns Activity skipped, not in Pending status
  MESSAGE: Primary key BillingID is missing
  MESSAGE: Missing subscript at position 1 for BAR.PAT.main
  MESSAGE: Unknown error [SYS] - Segment A is down, unable to start DrXferBkg[T:ADMQUERY]

Always confirm with your DR specialist. These are some general guidelines.
Opening Service Issues with MEDITECH

Service Issues

Issue Status
- *ALL*
- All except complete
- Complete
- Change Control (Live)

Submitted By Customer Contact
- McQueen, Dan
- Proffer, Ian
- Ring, Gary
- Rowe, Martha

Module
- *ALL*
- DR

Text Sort Order
- Chronological
- Inverse Chronological

Include Text Entries
- All Text Entries
- Last Entry Only

View/Edit Active Issues By Module
- Patient Safety
- All Active
- Edited Since
- No Edits Since

View/Edit Potential Patient Safety Issues
View/Edit All Active Issues
View/Edit Issues Edited Since
- May 12, 2012
- 0000
- (Eastern Time Zone)

View/Edit Issues Not Edited Since
- Apr 12, 2012
- 0000
- (Eastern Time Zone)

View/Edit Individual Issue #

View/Edit Audit Trail Issue #

Download Issues

Download Issues

Enter New Service Issue

Would you like to Search our Knowledge Base for issues?

View Completed Service Issues

Statistical Reports
Service Issue Guidelines

• Include ring release version in description along with table name and indication of the issue
  - 5.66 AdmVisitQueries Primary Key Missing VisitID
  - 5.66 MRI.DRC.insure.order - Missing subscript Pos 1
  - 5.66 LabSpecimenResults - Activity Skipped
  - 6.14 PhaRxAdminCriteria – Enable for transfer

• Maintain a Priority List for all of your DR tasks
• Provide as much detail as possible within the task
  - Include error log entry, frequency of error and other relevant symptoms

---

**Issue: DR #6133704 (Mar 2, 2015)**
**Status:** Open
**Priority:** Routine
**Priority Lists: #3 on DR Priority List**
**Description:** 5.66.07 LabSpecimenTests - Column Discrepancies
**Request Type:** Problem
**Customer Contact:** James Durbin (617-555-1212)
**Issue Notification:** james@whatsuphosp.org (All Edits)
**Module Notifications:** ACME,SMH (jmcdonald@acmeware.com) - MEDITECH Edits
Data Validation & Auditing
Auditing and Validation Options

• Auditing Applications
  ▪ Meditech DR Validation
    • MAGIC and CS 5.65, 6.x
  ▪ 3rd-Party Applications

• Manual validation
  ▪ Compare NPR / Report Designer reports to DR reports
Operations – Validations in M/AT

This tool is used to validate the data found in the DR M-AT tables.
# Operations – Validations in C/S

## Data Repository
- Operations Desktop
- Table Inquiry
- Field Inquiry
- Table Reports
- Data Transfer
- Validations
- View Errors
- View Exceptions
- View Database Logs
- File Maintenance
- Report Initialization
- Initial Load

## Validations
- Report Dictionary
- Schedules
- Process Jobs
- Results

## Report Dictionary
- Enter/Edit
- View
- Print
- Print by Application

## Mnemonic
<table>
<thead>
<tr>
<th>Mnemonic</th>
<th>AdmVisits</th>
</tr>
</thead>
</table>

## Active
*Active: True
- Name: AdmVisits

## Application
*Application: ADM
- All: N

## Include
<table>
<thead>
<tr>
<th>DPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>AdmVisits</td>
</tr>
</tbody>
</table>

## Criteria
- *Issues to Report: All
- *Sample Size: 10
- *Number to Check in Sample: 1
- Approximate Validation Coverage: 10%

## Batch Size
- Pace (in Seconds): 1000
Data Validation – 3rd Party

Abstracting Dictionaries Run [1224] Summary Report

- Status: Completed
- DR Database: testdb

Row Issues By Type
- Not Found
- Null Conv
- Invalid PK
- Column Issue

Row Counts

<table>
<thead>
<tr>
<th>Table</th>
<th>Source</th>
<th>Sample</th>
<th>DR</th>
<th>Hot Found</th>
<th>Missing Rows</th>
<th>Column Row Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>DataAccess</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>DataAccessPatientClasses</td>
<td>50</td>
<td>50</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>DataAccessRestrictedProjects</td>
<td>30</td>
<td>30</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>DataAccessUsers</td>
<td>54</td>
<td>54</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>53.7937%</td>
</tr>
<tr>
<td>DataAccess billed</td>
<td>30</td>
<td>30</td>
<td>0</td>
<td>12</td>
<td>8</td>
<td>9</td>
</tr>
</tbody>
</table>

Accuracy: 33.3335%
Manual Data Comparison

• Compare content of NPR/Report Designer with DR-based reports
  ▪ Review data side-by-side on existing reports
  ▪ Export data from MT to delimited file; import into SQL and write ad-hoc queries to compare against DR data

• DR tables DrTableMain and DrTableColumns help you map data from NPR to DR
Reporting Audit Discrepancies

• Only send recent data discrepancies to MEDITECH; it makes it easier to troubleshoot and resolve
• Limit service issues to one table or related tables only
• Task descriptions should include the table name along with “Missing Row” or “Column Discrepancy”
  ▪ Ex: 5.66 AdmVisits – Missing rows
• Attach the HTML report in your task or provide recent examples of missing primary keys from your SQL query
Microsoft SQL Server

Microsoft SQL Server 2008 R2

Microsoft SQL Server 2012

Microsoft SQL Server 2008

AcmeWare
What is an RDMS?

• A relational database management system...
  ▪ Stores and manages related data to serve one or more applications
  ▪ Allows data to be entered, edited, and deleted in tables
  ▪ Manages data integrity
  ▪ Offers secure access to information
  ▪ Much more...
SQL Server & Data Repository

- DR is not a typical database (it’s a relational database without relationships)
- The DR has 8,000+ tables as of 5.66, 15,000+ in 6.x
- Security is managed through SQL Server or Windows Active Directory (no connection to MIS user dictionary)
- The DR application includes SQL tables (including a Primary Key index) and stored procedure database objects
- Never modify your live and test DR databases – this will adversely affect your data transfers and data continuity
  - One exception: non-clustered indexes
  - Indexes should be backed up in a script file!
- Create SQL report objects (stored procedures, views, functions, etc.) in your own database
Server and Database Administration

• Server Maintenance
  ▪ Monitor overall disk space and usage
  ▪ Perform full database backups nightly

• Suggested Regular Database Maintenance
  ▪ Check data integrity
    • DBCC, SQL Maintenance Wizard
  ▪ Analyze and address index fragmentation
Database Administration

• Disk space vs. database space
  ▪ Make sure primary data drive has plenty of capacity for livedb growth
  ▪ MT recommends keeping 25% of total disk space free (livedb – E: drive)

  ▪ Database auto-growth options
    • Percentage vs. amount of space
    • Unrestricted vs. restricted space

• What happens when the drive is full?
Database Administration

• Table Indexes and fragmentation
  ▪ SQL Maintenance Wizard can address this, but not intelligently
    • Indexes may be dropped and recreated
    • Every single table in the database is analyzed
  ▪ Doing your own, targeted index maintenance is better
    • Assemble a list of tables you use for reports
    • Keep track of your own non-clustered indexes
Rebooting the DR Server

- Do not reboot the server without stopping the background jobs!
- What happens if you do?
  - Table sequences may be interrupted
  - Data might be skipped
  - Table initial loads ("IL’s") may need to be done to re-sync data
- You can stop the background jobs by:
  - Calling MEDITECH
  - Stopping the jobs via MEDITECH MIS application (non-MAGIC)
SQL Server Management Studio

• Microsoft Management Console (MMC) Application to manage SQL Server instances
• Use for enterprise-wide server & database administration
  ▪ Database backups, create logins, monitor server performance, manage user access to databases
• Use to develop T-SQL code and database objects – the basis for reports
  ▪ Stored procedures, views, user-defined functions
Management Studio Demo
Using SSMS to Write T-SQL Code

• A Transact-SQL statement can be:
  ▪ Entered as text
  ▪ Auto-generated using the Query Designer
  ▪ Loaded from an existing SQL Server stored procedure
  ▪ Loaded from a file
  ▪ Generated by scripting a SQL object

• Once designed, T-SQL Code can be:
  ▪ Validated syntactically
  ▪ Executed to produce a result set
  ▪ Executed to create, modify, or delete a SQL Server object
  ▪ Analyzed using with the Estimated Execution Plan to determine how the statement will be processed
  ▪ Optimized with the Database Engine Tuning Advisor

• T-SQL Code can be saved:
  ▪ As a SQL Server object (e.g., stored procedure, view, function)
  ▪ As a SQL statement or script – typically in a project located on your file system or local drive
Soup to Nuts, DR 102: SQL Development

- Finding Data
  - How can you find data in the DR?
- Organization
  - Database, Stored Procedures and Tables
- Efficiency
  - How to make your code run fast and more efficiently
- T-SQL TIPS
  - Helpful code tips
Report Presentation Options
Presenting Your Data

• SQL Server Reporting Services
  ▪ Report Manager
  ▪ Report Builder
  ▪ Analysis Services
• Other Custom Report Products
  ▪ SAP Crystal Reports
  ▪ KRONOS Analytics
  ▪ Cognos
• Third Party DR-Based Products
## Reporting Services (SSRS)

### Clinical Quality Measures ED Summary

#### SQL Server Reporting Services

#### Meaningful Use

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<tr>
<th></th>
<th>VTE-3</th>
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Data Compile Date: 3/15/2012 12:20 PM
Discussion, Q&A

Come see our other MUSE sessions!

• Tuesday 5/26 9:30-12:00
  ▪ 701 - Soup to Nuts – Data Repository 101
  ▪ 703 - Converting reports from NPR to SQL
• Tuesday 5/26 1:00-3:30
  ▪ 801 - Soup to Nuts – Data Repository 102
  ▪ 803 - Alphabet Soup of Clinical Quality Reporting
• Wednesday 5/27 10:30
  ▪ 1095 - Using Meditech Data to Drive Clinical Decision Support
• Thursday 5/28 9:15
  ▪ 1094 - Meaningful Use Audit, Is Your Organization Ready?
  ▪ 1133 – Click Here to Upgrade your DR to 6.1