KE Emu: Getting a Flightless Bird Off the Ground

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Where The Field was

- 24.1 Million specimens as of 2007
  - 14 million of which was Insects, Arachnids & Myriapods
- All departments/divisions with separate, sometimes multiple databases (60+)
- Different platforms & structures
  - Access, Paradox, FileMakerPro, Excel, MySQL
  - In-house programmed (in C-base)
- Some stretching program limits
- Web serving difficult, *ad hoc*
**KE Software & EMu**

- **Electronic Mu**seum collection database management system; multiuser by design
- KE based in Melbourne, Australia, with branch offices in Canada, UK and France for support
- Originally designed for cultural collections
- Proprietary database engine: Texpress
- Hybrid object-relational database
- Highly modular (entirely customizable onsite)
- Provides high-speed searches and the ability to do complex queries across data boundaries
Costs and KE Support

- Initial cost dependent on users, databases to convert and training required
- Annual license fees cover maintenance, system upgrades, support & troubleshooting 24/7/365, 4 hour response guarantee
- Need some local expertise (varies with size); some small clients use only KE support
- Sliding cost based on simultaneous-user count (current commitment $40K annually)
  
  FMNH: 100+ total users (+ web use), now 34 licenses, $1200-1400 each/year
EMu User Base and Local Support

• Users: small to large museums
• Over 130 clients worldwide
• KE sponsors 3 user group meetings/year
• User Groups have driven many feature changes
• FMNH formal structure:
  Primary admin (dedicated IT support staff)
  1 collection staff super-user
  1-3 power users (managers) per department/division
  multiple users per department/division
Module features

- **Summary**
- **Help!!!**
- **Links to another module**
- **Lookup list**
- **Tabs**

The image shows a software interface with various features highlighted:

- **Summary** section
- **Help!!!** button
- **Links to another module** feature
- **Lookup list** section
- **Tabs** feature
Insects Workflow
Helpful tools

• **Drag & Drop** linking – good for data integrity
• **Ditto** function – copy any/some/all fields of one record to another
• **Default** values – set by user (admin for some) separately for searching and record inserting; multiple default sets can be saved for reuse
• Sharing permissions – set by user for groups, reports, searches
• Global replace and Merge
• Multi-field sorting w/optional output of summaries
• **Recall** feature
• **Resource Tool**
Multimedia

• Any type of media can be attached
  • Documents (pdf, doc, ppt)
  • Spreadsheets (xls)
  • Video (avi, mpeg, mp4)
  • Audio (mp3, wav)
  • Websites (html)
  • Images (jpeg, png, tiff, gif, bmp)
• Jpeg formatted images are preferred
• Currently The Field has 690,921 multimedia files, 575,839 of which are images
Importing

• Can batch-import data (incl. images) via properly designed CSV or XML files
• Importing data is manual, requires experience & permissions
• Automated Record Creation - can set up a template in EMu to batch create records w/consecutive #s plus any repeated data desired
Barcoding

• Field for barcodes in Catalog (will soon be merged with catalog number)
• Our barcodes will match their catalog irns in EMu (fewer numbers)
• Data matrix labels generated by Crystal Report, printable on our LaserJet printers
• Potential to streamline data entry, the loan process and collection management
Georeferencing & Mapping

- Sites module follows GBIF best practices
- **Automatic DMS ↔ DD conversion**; color coding can show entered vs. calculated
- Also fields for UTM, TRS, and metadata
- Can be set up for 1-click link to any online gazetteer or other georeferencing tool (Resource tool)
- Mapping via ArcExplorer templates, with EMu reports providing data; can add multiple GIS layers as needed
Infrastructure

- Primary collections data are stored on a dedicated server
- Vetted, non-sensitive data is replicated on a separate, outward facing server for delivery to:
  - FMNH website
  - GBIF ([http://www.gbif.org/](http://www.gbif.org/))
- EMu data (including registry entries and images) backed up regularly:
  - Daily (kept 1 week)
  - Weekly (kept 1 month)
  - Monthly (kept 1 year, offsite)
  - Annually (kept offsite)
Portals

• IMu, or Internet Muuseum for highly customizable searches and experiences, PHP based
• Drupal/Solr connection was launched in March 2011 for the museums departmental collections and project websites (http://fieldmuseum.org/explore/our-collections).
  Now available publicly at:
  • https://github.com/palantirnet/kiwi
  • http://drupal.org/project/sarnia
EMu to GBIF

- Darwin Core fields filled automatically in catalog, exported to our DiGIR server & IPT services:
  - [http://data.gbif.org/datasets/provider/49](http://data.gbif.org/datasetsprovider/49)

- Requires KE to set up and maintain DiGIR data mapping (they track & implement changes in GBIF, DiGIR, DwC standards)

- Currently providing 1.82 million records to the public and peers (≈7% of our holdings)
Data Security

- Permissions set on user-, group-, or system-wide basis to determine who can edit or delete
  - Most users can read/insert/edit/save, NOT delete (managers only); training for higher permissions
  - Sociopolitical issue: institutional backing for access restrictions is essential – not everyone should be all-powerful
  - Creates bottlenecks

- **Audit trail & Recall** features allow managers to track changes and deletions
### Audit Trail

<table>
<thead>
<tr>
<th>User</th>
<th>Date</th>
<th>Time</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>rshuman</td>
<td>10 Apr 2013</td>
<td>13:04</td>
<td>update</td>
</tr>
<tr>
<td>agrant</td>
<td>27 Jul 2012</td>
<td>12:33</td>
<td>update</td>
</tr>
<tr>
<td>ksober</td>
<td>17 Mar 2010</td>
<td>11:46</td>
<td>insert</td>
</tr>
</tbody>
</table>

**Audit Record**

- **Date:** 10 Apr 2013
- **Time:** 13:04
- **IRN:** 711461

**Update**

- **Admin Date Modified:** 2013-04-10
- **Admin Modified By:** Rebekah Shuman
- **Admin Time Modified:** 13:04 09:000
- **Dar Date Last Modified:** 2012-07-27
- **Dar Life Stage:** adult female - worker
- **Dar Sex:** adult female - worker
- **Lot Semaphore Tab:**
  - 1. adult female - worker
  - adult unsexed
Where we are now

- 1.82 million out of 25 specimens published online
  ≈ 7% of our total specimens
  - 167,674 Insect records (insects, arachnids, myriapods)
    ≈ 1% of our Insect specimens
- 690,921 multimedia records
  - 83% are images alone
- Repatriation module – unique to FMNH
  - Used mainly by Anthropology
  - Simplified version used by Herps to track visitors, information loan requests and collection activity
  - Being offered to other institutions
EMu Needs Improvement

• Underlying database engine proprietary, aging
  • Better: open code, up-to-date; could be much faster, more efficient (server upgrades help)
  • Some complex searches inefficient (not nested as they seem to be/should be)
  • Range searches (>). or <) on numbers and dates require KE pre-setup (version 4 will assist in this but is still a long way off)

• Formatted reporting via Crystal Reports – clumsy, complicated (but CSV export/reporting easy)

• Doesn’t work reliably over wireless networks
Where we want to go

• Field consolidation
• Barcoding integration into workflow
• Exhibit collections management (reliant on personnel availability)
• Develop interface for working with Filtered Push and other citizen science initiatives (funding reliant)
• mvWise (Museum Victoria Wireless Input System for EMu) for hand-held digital collections management
  • Barcode scanner ad RFID capable
  • Wireless network EMu connection required
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