



# 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



- **E**lectronic **M**useum 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

irn

Lookup list

Tabs

The screenshot shows a software window titled "Taxonomy (1) - Display". The menu bar includes File, Edit, Select, View, Tools, Tabs, Hierarchy, Multimedia, Window, and Help. The toolbar contains various icons for file operations and navigation. The main content area displays taxonomic information for "Pheidole bicarinata Mayr, 1870" with the number "60309" in the top right. The interface is divided into several sections: "Classification" with fields for Parent, Family & No., Genus & No. (Pheidole), Subgenus, Species (bicarinata), Subspecies, and Other; "Hybrid & Parentage" with fields for Hybrid?, Rank, Sex, and Parent; "Cultivar Name" with fields for Cultivar? and Name; and "Controls" with fields for Applicable Code (ICZN) and Rank (Species). At the bottom, there are tabs for "Classification", "Higher Class.", "Authors", "Citations", "Primary Citation", "Geog. Status", "Homotypics", and "All Syn". A status bar at the very bottom shows "Display", "Taxon 1 of 1", and user names "rshuman", "InsectsMgr", and "emufmnh".

**Catalogue (1) - Display**

File Edit Select View Tools Tabs Parts Multimedia Window Help

Insects (Formicida) : Hymenoptera : Pheidole bicarinata Mayr. 1870 : FMNH-INS 0000 047 140

Lot Details  
 Coll Ev/Locality: [FMNH.Emu.CE.IRN\_179812] North America, U.S.A., Kansas: Manhattan  
 Region: Nearctic  
 Inventory: Found  
 Barcode: \*  
 Total Count: 1

Semaphor...	w. pi...	slide	d.	Estimate	Type St...	Notes
1	adult fe...	1		No		only head
*						

Physical History List

Action	Description	Person	Action Date	History Notes
1	damage	Mrs. Rebekah J. S...	08 Feb 2010	
*				

**Collection Events (1) - Display**

File Edit Select View Tools Tabs Multimedia Window Help

[FMNH.Emu.CE.IRN\_179812] North America, U.S.A., Kansas: Manhattan 179812

Participants

Name	Role
1 M. C. Tanquary	Collector
*	

Contract Details

Number	Recipient	Description
*		

**Sites (1) - Display**

File Edit Select View Tools Tabs Multimedia Window Help Standards

[FMNH\_H.Emu.Site.IRN\_337056] North America, U.S.A., Kansas: Manhattan

Locality Details  
 Continent: North America  
 Country: U.S.A.  
 Province/State: Kansas  
 District/County: Manhattan  
 City/Town: Manhattan  
 Nearest Named Place: Manhattan  
 Biogeography/Region: Manhattan  
 Precise Location: Manhattan  
 Verbatim Locality: Manhattan

**Taxonomy (1) - Display**

File Edit Select View Tools Tabs Hierarchy Multimedia Window Help

Pheidole bicarinata Mayr. 1870 60309

Classification  
 Parent: [ ]  
 Family & No.: Formicidae  
 Genus & No.: Pheidole  
 Subgenus: [ ]  
 Species: bicarinata  
 Subspecies: [ ]  
 Other: Other Rank Other Value  
 Seq. Num.: [ ]

Hybrid & Parentage  
 Hybrid? No Rank: [ ]  
 Sex: [ ] Parent: [ ]

Cultivar Name  
 Cultivar? No Name: [ ]

Controls  
 Applicable Code: ICZN Rank: Species

Scientific Name  
 Automatic? Yes Name: Pheidole bicarinata Mayr. 1870  
 Currently Accepted Name  
 Currently Accepted? Yes Current Name: Pheidole bicarinata Mayr. 1870

Classification Higher Class. Authors Citations Primary Citation Geog. Status Homotypics All Synonyms

Display Taxon 1 of 1 rshuman InsectsMgr emufmnh

**Parties (1) - Display**

File Edit Select View Tools Tabs Multimedia Window Help

M. C. Tanquary

Party Type  
 Person

Language  
 Primary: [ ]  
 Dialect: [ ]

Derived Names  
 Automatic: [ ]  
 Salutation: Sir/Ms/Mr/Ms/Ms/Ms  
 Full: M. C. Tanquary  
 Brief: M. C. Tanquary  
 Cited: Tanquary  
 Taxonomic: Tanquary

Person Details  
 Title: [ ]  
 First: M.  
 Middle: C.  
 Last: Tanquary  
 Suffix: [ ]  
 Other Names: \*

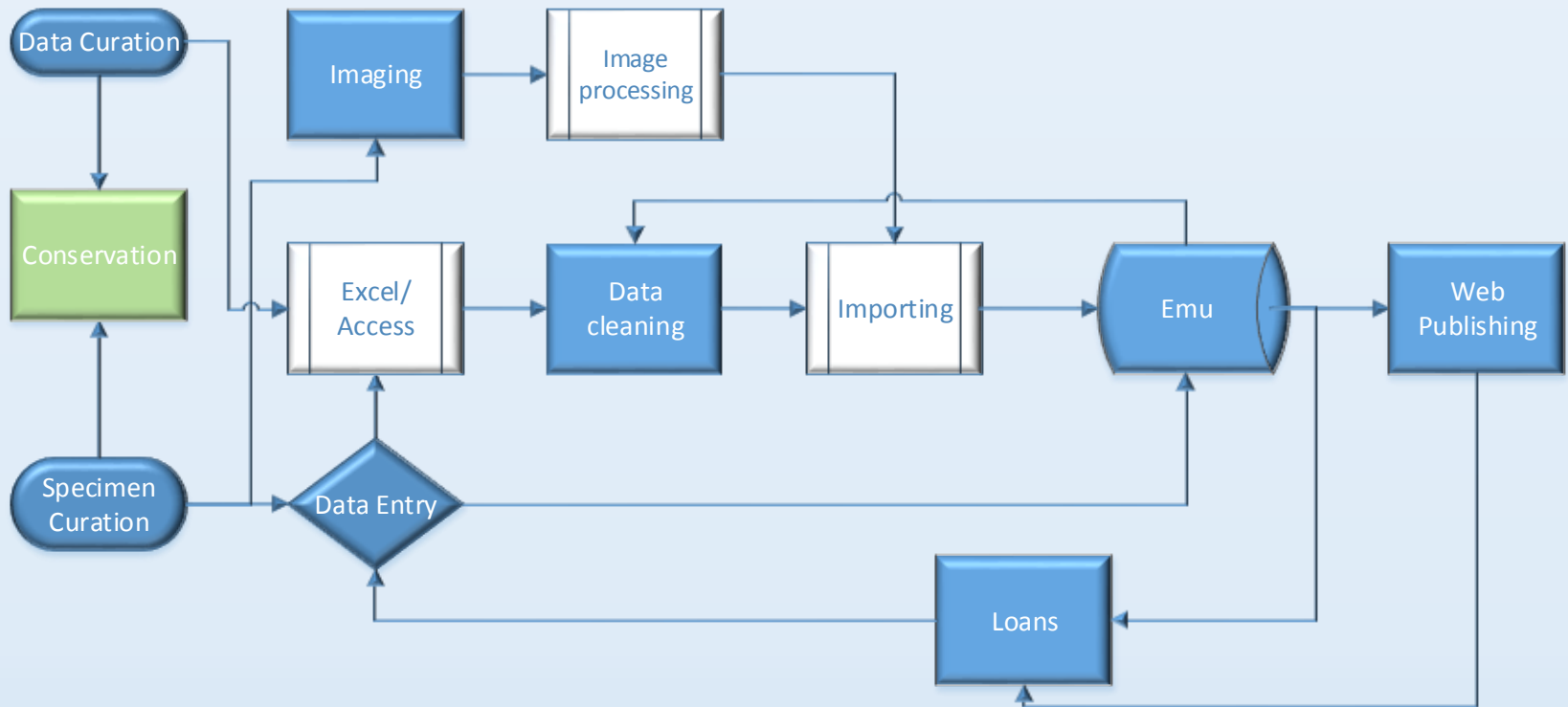
Gender  
 Female Male Unknown

Source of Information  
 Insects Master

Person Organisation Address Roles Associations Biography Synonymy

Display Party 1 of 1 rshuman InsectsMgr emufmnh

# 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**

KE EMu (FMNH) - I...

-  Catalogue
-  Taxonomy
-  Sites
-  Collection Events
-  Transactions
-  Consultation
-  Bibliography
-  Parties
-  Narratives
-  Multimedia
-  Thesaurus
-  Gazetteer
-  Lookup Lists
-  Groups
-  Task Templates
-  Schedules
-  Exports
-  Field Help
-  Audit Trails
-  Statistics
-  Exit
-  Help

# 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

Catalogue (1) - Display

File Edit Select View Tools Tabs Parts Multimedia Window Help

Insects (Coleopter) : Coleoptera : *Creophilus erythrocephalus* (Fabricius, 1775) : FMNH-INS 0000 2308386

Resource Information

Title: \_\_\_\_\_

Creator: \_\_\_\_\_

MIME Type: \_\_\_\_\_ MIME Format: \_\_\_\_\_

Identifier: \_\_\_\_\_

Description

\_\_\_\_\_

Catalog Lot - Lots Identification Host Eco Relation Preservation Lot History Loan

Display Object 16 of 16 rshuman InsectsMgr emufmnh

KE EMu (FMNH) - I...

- Catalogue
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<< My P... >> Coleopt... Search Coleoptera

Organize Open Share with

Favorites

- Desktop
- Downloads
- Recent Places

Desktop

- Libraries
- Documents
- Music
- Pictures
- Videos
- Shuman, Rebeka

Creophilus\_erythr  
ocephalus\_17964  
(2)

Creophilus\_erythrocephalus\_17964 (2)

# 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

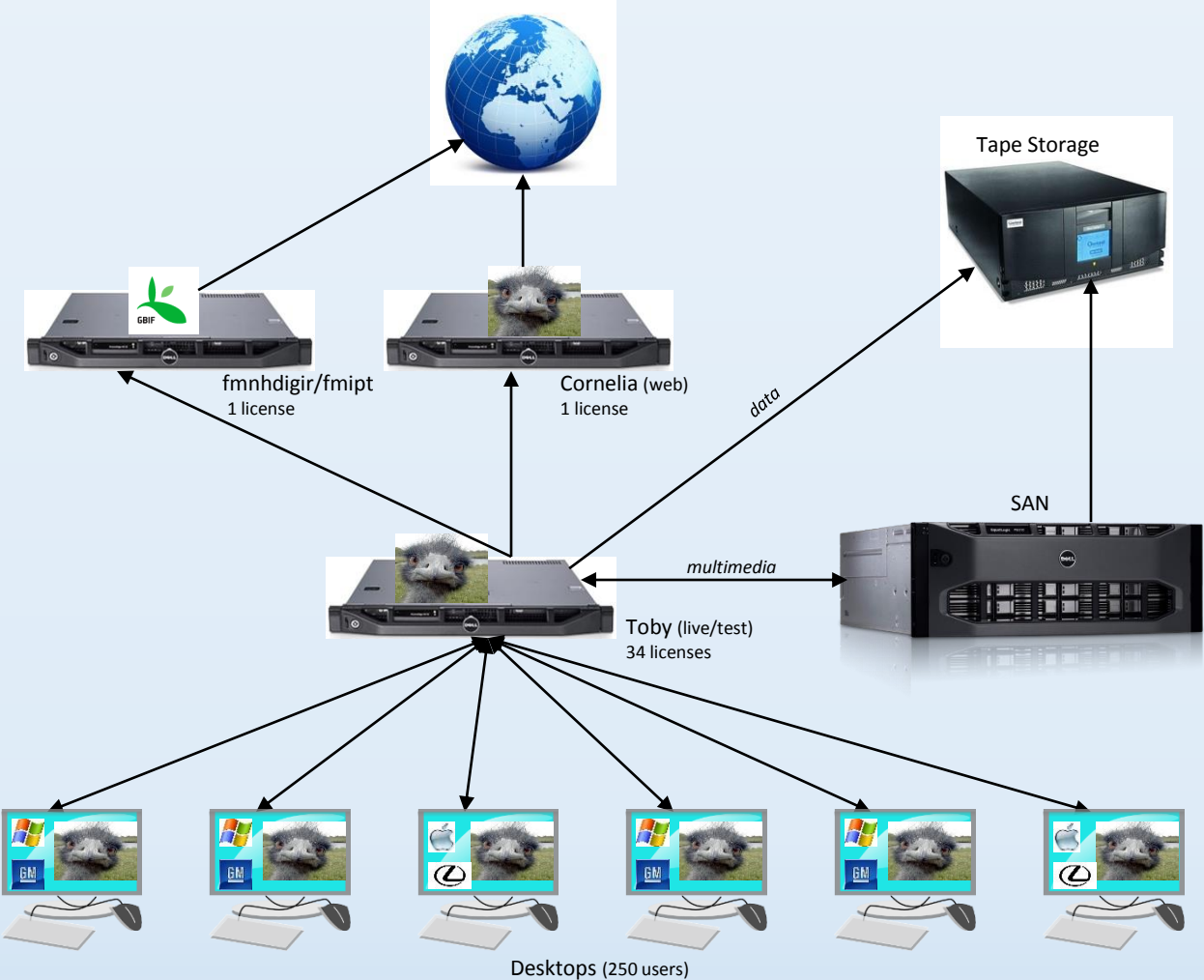
- Sites module follows GBIF best practices
- **Automatic DMS ↔ DD conversion**; color coding can show entered vs. calculated
- Also fields for UTM, TRS, and metadata
- Can be set up for 1-click link to any online gazetteer or other georeferencing tool (Resource tool)
- Mapping via ArcExplorer templates, 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/>)
  - VertNet (<http://vertnet.org/index.php>)
- 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)



# Infrastructure



# Portals

- IMu, or **I**nternet **M**useum 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://fmipt.fieldmuseum.org:8080/ipt/>
- 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 ( $\approx 7\%$  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

Catalogue (1) - Display

Insects (Formicida) : Hymenoptera : Formicidae : FMNH-INS 0000 062 016 711461

Audit Trail

	User	Date	Time	Operation
1	rshuman	10 Apr 2013	13:04	update
2	sgrant	27 Jul 2012	12:33	update
3	ksoler	17 Mar 2010	11:46	insert

Deaccession References Multimedia Tax

Display Object 165 of 191

Audit Trails (1) - Display

10 Apr 2013 13:04. rshuman. update. ecatalogue. 711461 20045787

Audit Record

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

**Update**  
 AdmDateModified: 2013-04-10  
 2012-07-27  
 AdmModifiedBy: Rebekah Shuman  
 Sharon Grant  
 AdmTimeModified: 13:04:09.000  
 12:33:25.000  
 DarDateLastModified: 2013-4-10T13:04:09.000CMT  
 2012-7-27T12:33:25.000CMT  
 DarLifeStage: adult female - worker  
 adult unsexed  
 DarSex: adult female - worker  
 adult unsexed  
 LotSemaphoront\_tab: 1. adult female - worker  
 adult unsexed

Summary Audit Admin

Display Record 1 of 3 rshuman InsectsMgr emufmnh

KE EMu (FMNH)

- Catalogue
- Taxonomy
- Sites
- Collection
- Transaction
- Conservation
- Bibliography
- Parties
- Narratives
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- Field Help
- Audit Trails
- Statistics
- Exit
- Help

# Where we are now

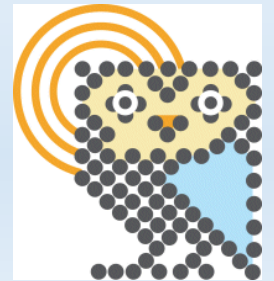
- 1.82 million out of 25 specimens published online  
≈ 7% of our total specimens
  - 167,674 Insect records (insects, arachnids, myriapods)  
≈ 1% of our Insect specimens
- 690,921 multimedia records
  - 83% are images alone
- Repatriation module – unique to FMNH
  - Used mainly by Anthropology
  - 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 (**M**useum **V**ictoria **W**ireless **I**nput **S**ystem for **E**Mu) for hand-held digital collections management
  - Barcode scanner ad RFID capable
  - Wireless network EMu connection required
  - <http://mvwise.museum.vic.gov.au/Home.htm>





# Thanks to

- **Margaret Thayer**, for the use of her ECN EMu presentations (2008, 2011)
- **Joanna McCaffrey**, initial FMNH database architect
- **Sharon Grant**, IT Academic Liaison and EMu admin/guru
- **Janeen Jones**, Invertebrates Asst. Coll. Mgr. and EMu superuser/assistant-admin & support
- IMLS; NSF; Mellon Fdn. (+ others) for funding various parts of FMNH's EMu conversion / implementation (2002 – present)
- Very special thanks to the myriad of volunteers, interns & guinea pigs over the years



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