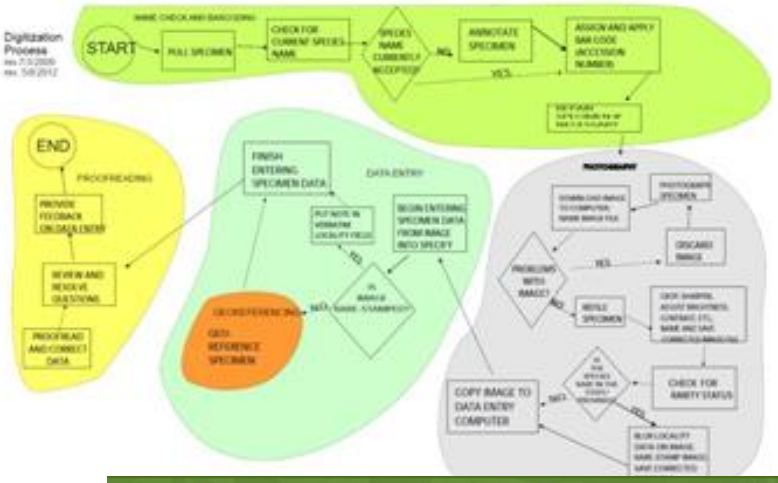
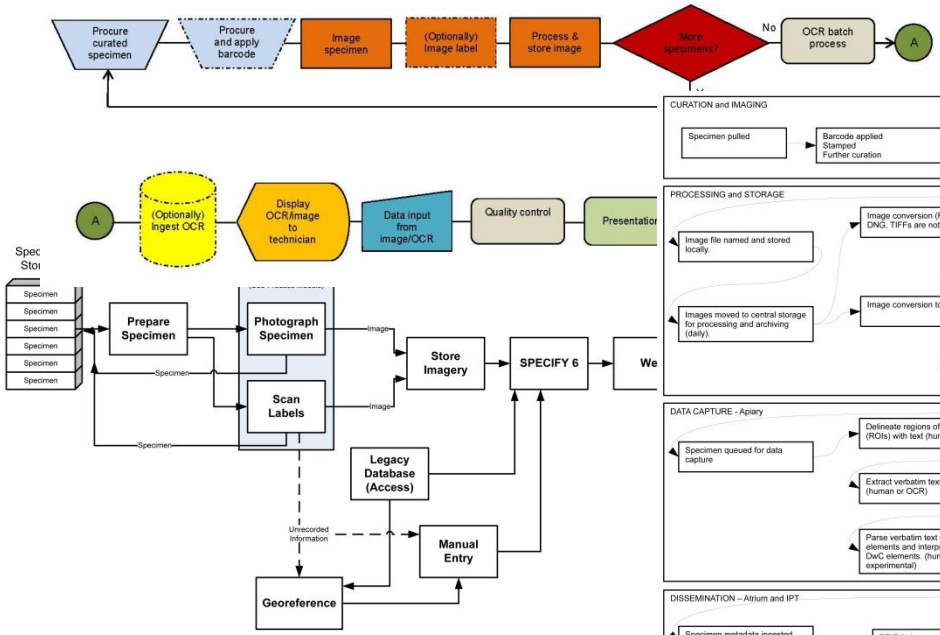
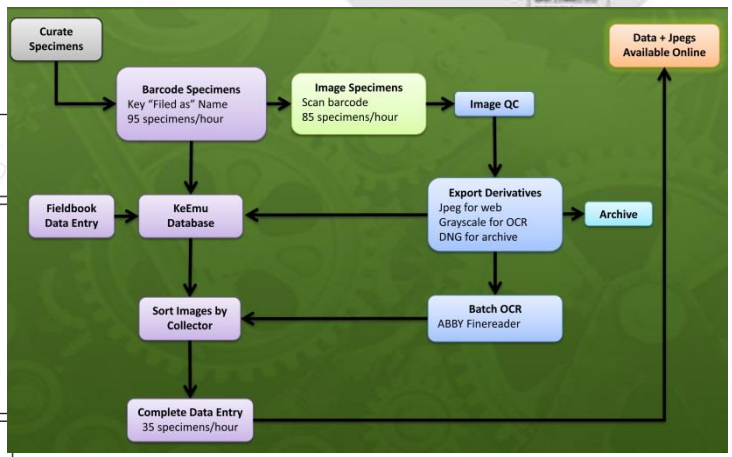
Wet Collections Digitization Workshop

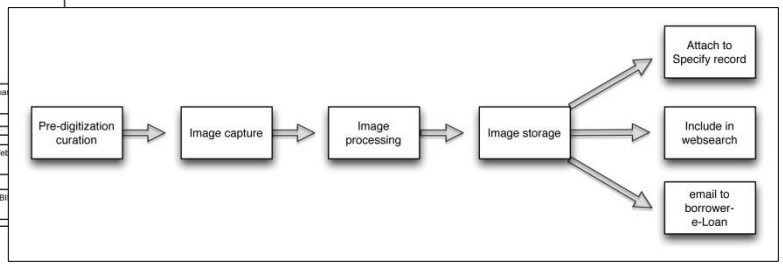
iDigBio
Integrated Digitized Biocollections

Digitization Workflows



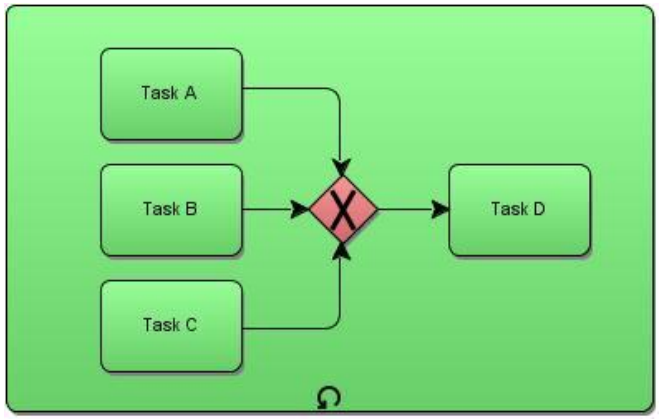






Wet Collections Workshop
Gil Nelson
4-6 March 2013
University of Kansas

Values of defined workflows



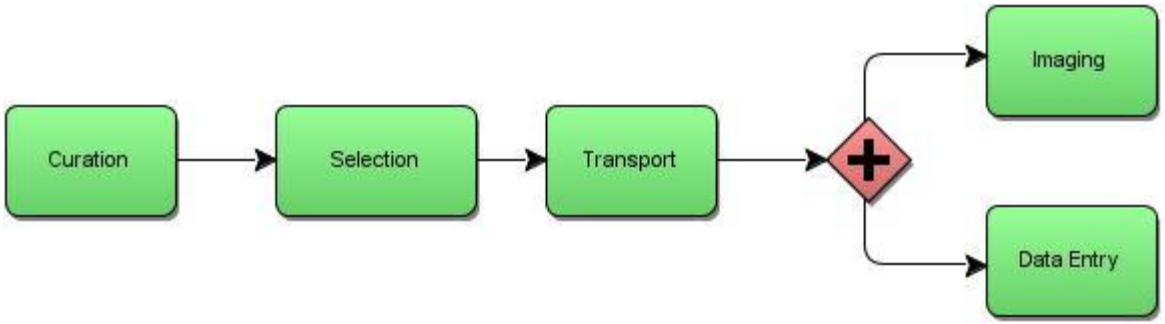
- Promote efficiency and automation of processes
- Facilitate routing and scheduling of activities
- Provide for balancing workloads
- Ensure that processes are visible and predictable
- Allow for escalations and notifications
- Enhance tracking of tasks
- Foster collaboration of all parties involved
- Stimulate the convergence of process and information
- Promote continuous evaluation and redesign

Pre-planning a Workflow Process

- Identify the database management system and imaging equipment to be used.
- Identify the process/module for which the workflow will be designed.
- Identify (*in excruciating detail*!) the tasks (or task clusters) that constitute the process/module.
- Identify the specific actions to be taken and the attributes (if any) associated with these actions.
- Identify roles (and only secondarily the people who will fill them).
- Identify points/processes/parameters for notifications and escalations.
- Identify dependencies, transitions, and iterations.
- Determine minimal data requirements for defining a complete record.
- Determine how records and objects will be uniquely identified in a global environment.
- Determine how identifiers will be assigned.
- Determine if/how identifiers will be affixed to the specimen/lot/collection object.
- Determine a consistent file naming strategy for images, attachments, other related materials.
- Determine file storage needs and location for data, images, and ancillary materials.
- Define and diagram flow.

Example Processes (Modules), their Cycles and Dependencies

Process	Cycle	Dependency
Software configuration	Once/non-recurring	
Equipment set-up	Once/non-recurring	
Specimen curation	Recurring	
Specimen selection	Recurring	Pre-digitization curation
Specimen transport	Recurring	Specimen selection, imaging, data entry
Conservation	Episodic	Curatorial processes, imaging, data entry
Data entry	Recurring/tasks iterative	Specimen transport
Imaging	Recurring/tasks iterative	Specimen transport
Equipment adjustment	Episodic	Data entry/imaging
Software update/tweaking		
Specimen return/shelving	Recurring	Imaging or data entry



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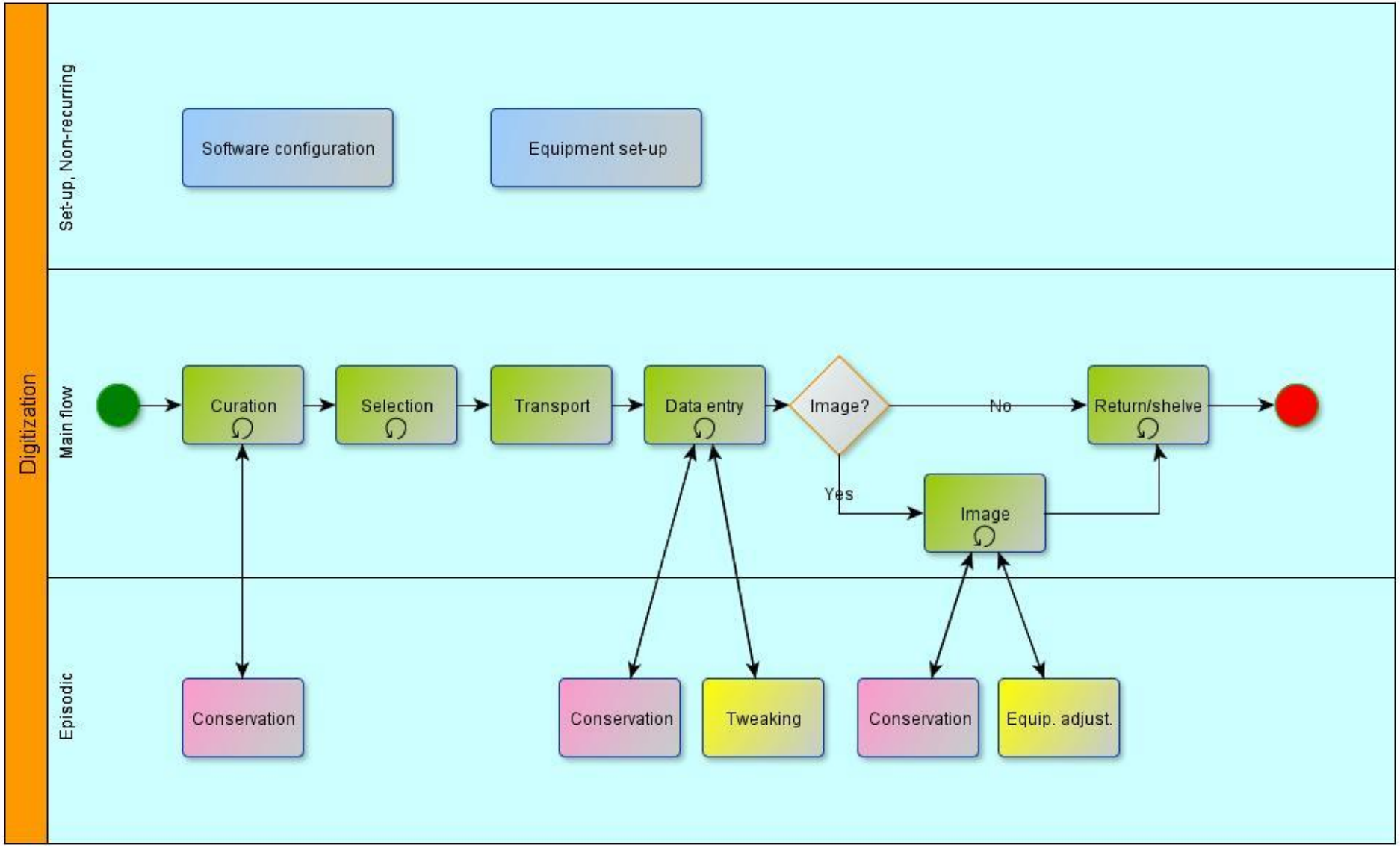


A sample, detailed task list.

1. Open Capture NX2 and View NX2.
2. Open Camera Control Pro 2.
3. Open default.ncc as settings file:
   Settings->Load Control Settings
   ->My Documents->CameraSettings->default.ncc.
4. Create a folder in X:\SpecimenImages\NEF, using the current date as the folder name, as 2013-02-27.
5. Retrieve next specimens to image from cabinet.
6. Insert Image “From Here” tag to proper place in cabinet.
7. Set image number in Camera Control 2 to next bar code:
   tools->download options
   Edit
   Start numbering at: <Enter next bar code number; no leading zeros>.
8. In Download Options, set the default folder to the one you created in step 4.
9. Position specimen in frame, ensuring complete specimen is visible.
10. Open Live View, position the focus square on specimen.
11. Click AF to test.
12. Click AF and Shoot.
13. Once the first image loads, navigate to it in Capture NX2 or View NX2.
14. Open the image, zoom in and check margins to ensure all of the specimen is visible.
15. Repeat 8-11 until satisfied, resetting image number each time.
16. Close Live View.
17. Load next specimen in frame.
18. Use remote release on camera and record the images.
19. As you shoot, check each image bar code to ensure it is in sequence with the one preceding it and matches the next one in the series.
20. For out-of-sequence bar codes, change the number in the download options.
21. Repeat 17-20 until all specimens are imaged.

Rules for Defining Roles

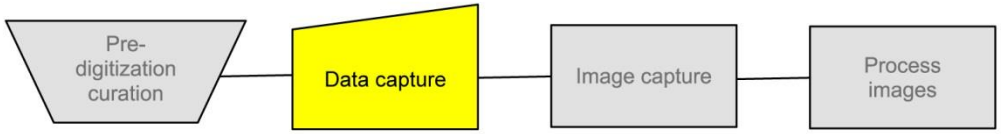
Tasks are assigned to roles, not individuals.

Generic roles require less maintenance than highly specific ones. Modifying roles that resolve to an individual must be done much more frequently than roles that resolve to a person group.

If possible, associate each module with a single role, with the contents of that module encompassing the tasks that a person in that role must be able to perform.

Modules that require more than one role should be divided into separate modules, or at least into submodules.

Role definitions should include tasks required for managing transitions between modules.



Guiding Principles

Follow a modular approach

- "Plug and play" modules are preferred.
- Simple modules involving a limited number of tasks are easier to troubleshoot and maintain.
- Divide large modules into sub-modules.
- Modules are generally self-contained but tangential.
- There is no consensus workflow, virtually all workflows are customized.

Assign roles deliberately

- Adjust to strengths of each technician--using students and volunteers requires flexibility in role assigned to personnel rather personnel assigned to role.

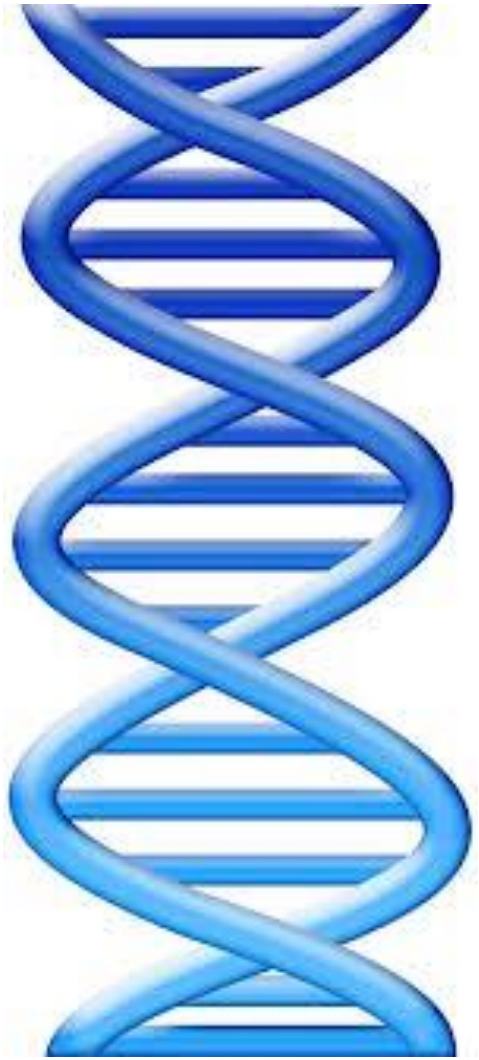
Create task lists

- Complete.
- Clear.
- Succinct.
- Ordered.
- Reusable.

Guiding Principles

- **Provide for efficiency**
  - Contrasted with speed.
  - Reduce technician fatigue.
  - Maintain technician focus.
  - Optimize task execution times (time/motion)
    - Record statistics
    - Make adjustments.

- **Ensure conservation of movement**
  - Positioning and compactness of work station components.
  - Left to right vs. right to left.
  - Starting and ending locations.
  - Proximity of equipment (including mouse).



Guiding Principles

- **Multi-tasking**
  - Making the most of down time (regardless how long).
  - Nesting shorter tasks (start one task, start another)
    - Overcoming distractedness.

- **Workflow simulation and modeling**
  - Analyzing temporal juxtaposition of workflow task clusters.
  - Analyzing spatial juxtaposition of workflow task clusters.

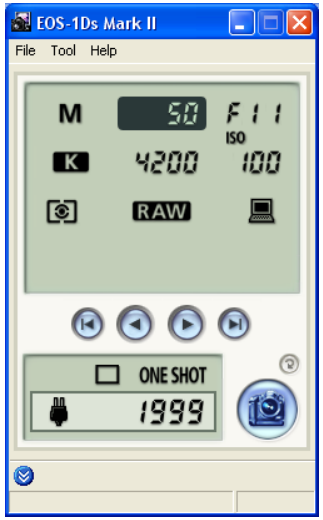
- **Task list simulation**

Guiding Principles

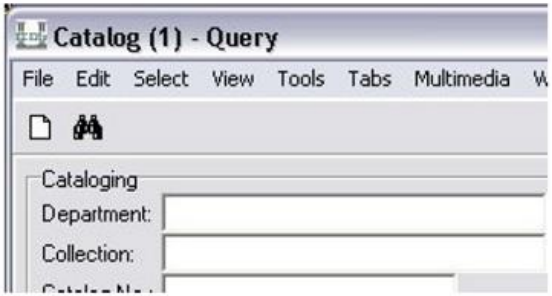
- **Segmenting clusters and subroutines**
  - Standalone repetitive processes.
    - Barcoding.
    - Imaging.
    - Image processing.
    - Re-shelving.
  - Conservation and repair.
  - Georeferencing.
  - OCR.

Documentation and Instructions

- **Written Protocols**
  - Essential!
  - Include pictures.
  - Attention to detail (leave nothing to the imagination).
  - Express limits on technician authority.



- **Feedback Loops**
  - Technicians: best source of efficiency adaptations, either by show or tell.
  - Easy methods for receiving feedback.
  - Personal copies of the protocol.
  - Master copy available via Google docs or other shared storage for updates and suggestions.



Continuous Workflow Improvement

Develop written workflows that reflect actual practice

Continuous evaluation of written and actual workflows by:

- Technicians
- Workflow managers
- Collections managers

With particular attention to:

- Bottlenecks
- Redundancy
- Handling time
- Varying rates of productivity

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Guiding Principles