

## Newt, the third prototype

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# What is Newt?

- ▶ A rapid application develop tool
  - ▶ for applications that curate metadata
- ▶ Audience: Libraries, Archives, Galleries and Museums

## Findings from Prototype 2:

*Is Newt and “off the shelf” software enough to create metadata curation applications?*

Short answer is **yes**. Longer answer is more nuanced.

## Findings from Prototype 2:

*Is Newt and “off the shelf” software enough to create metadata curation applications?*

1. Newt's YAML file can grow very large for applications with many data models
2. Model vetting and validation should happen early in the data pipeline, ideally as a generated program and browser side
3. Postgres+PostgREST is a powerful combination but it'd be nice to have something simpler
4. Managing the YAML file can be done conversationally

## Questions raised by Prototype 2:

- ▶ Where do I focus my simplification efforts?
- ▶ How do I ensure that large YAML files remaining human manageable?
- ▶ Mustache template language is a little too simple, what should replace it?

## High level Concepts (remain the same)

- ▶ describe the application you want
- ▶ generate the application you described
- ▶ running the application using a service oriented architecture

## Implementation Concepts (remaining the same)

- ▶ JSON data sources
- ▶ data modeled in YAML
- ▶ routing requests through data pipelines



## Themes (remains the same)

- ▶ Pick Simple = (No coding) + (Less coding)
- ▶ Compose applications using data pipelines
- ▶ Avoid inventing new things

## Goal of Prototype 3: Questions to explore

1. What should the default JSON data source be? (dataset+datasetd or Postgres+PostgREST)
2. Is generated TypeScript middleware the right fit? (e.g. validation service, template engine)
3. Is Handlebars a good fit for managing data views and rendering HTML?
4. Should the template engine be generic or a generated TypeScript program?

## Goal of Prototype 3: Extra credit question

- ▶ Can I leverage WASI+WASM to make useful Python libraries available to Deno and browser?

## Changes from last prototype

- ▶ Removed some Go cli (e.g. ws, mustache, newtmustache)
- ▶ Generating collection and YAML for dataset+datasetd
- ▶ Generating Handlebars templates
- ▶ Generating TypeScript validator as middleware run via Deno
- ▶ Generating Handlebars as template engine as middleware run via Deno
- ▶ Using Deno to generate JS/ES6 for web browser

## Off the shelf (no coding)

- ▶ JSON Data Source
  - ▶ Dataset + datasetd
  - ▶ Postgres + PostgREST
- ▶ TypeScript middleware run via Deno
- ▶ Newt Router, ties it all together

## Other Off the self

- ▶ Solr
- ▶ OpenSearch

## Assemble app from YAML (less coding)

- ▶ The application you want is described in YAML
- ▶ Create the initial Newt YAML through a conversational TUI
- ▶ Newt generates the code you need
- ▶ Customize by editing the generated code and managing your pipelines

## How are data models described?

- ▶ A model is a set of HTML form input types
- ▶ Expressed using GitHub YAML Issue Template Syntax
- ▶ Model describes HTML and implies SQL



## How do I think things will work?

1. Interactively generate our application's YAML file
2. Interactively define data models
3. Generate our application code
4. Run `newt generate ...` for primary data source
5. Run `newt run ...` to run the application

Steps one and two are interactive

```
newt init app.yaml  
newt model app.yaml
```

## Step three, generate our code

```
newt generate app.yaml
```

*Create a dataset collection and datasetd YAML file Render Handlebars templates*

*Wires up routes Adds tasks to deno.json*

## Step four, setup primary JSON data source

### Dataset collection

*Collection generation is done “auto magically” by `newt generate app.yaml`  
`datasetd` YAML file gets generated so Newt can run the `datasetd` JSON API*

Step five, run your application and test

```
newt run app.yaml
```

*Point your web browser at <http://localhost:8010> to test*

Can I run a demo?

Not yet, hopefully in early December 2024.

## Third prototype Status

- ▶ A work in progress (continuing through 2024)
- ▶ Working prototype target date June 2025
- ▶ Using internal applications as test bed

## How much is built?

- ☒ Newt developer tool
- ☒ Router is implemented and working
- ☒ ~~Mustache template engine is working~~ (removed)
- ☐ Generator development (paused, back to design stage)
- ☐ Modeler (design stage)
- ☐ Handlebars template engine (to be generated by Newt)



## Insights from prototypes 1 & 2

- ▶ “Off the shelf” is simpler
- ▶ Lots of typing discourages use

## Insights from prototypes 1 & 2

- ▶ SQL turns people off, use a code generator
- ▶ Hand typing templates is a turn off, use a code generator
- ▶ Large YAML structures benefit from code generation
- ▶ Automatic “wiring up” of routes and templates very helpful

## What's next to wrap up prototype 3?

- ▶ Retarget, Debug and improve the code generator
- ▶ Continue to design and implement a data modeler
- ▶ Extend Generator to include generating validator and template engine middleware

## Out of the box

- ▶ Newt (development tool)
- ▶ Newt Router

# Unanswered Questions

- ▶ What is the minimum knowledge required to use Newt effectively?
- ▶ Who is in the target audience?

## Someday, maybe ideas

- ▶ A visual programming approach could be easier than editing YAML files
- ▶ Direct SQLite 3 database support or integration
- ▶ A S3 protocol web service implementing object storage using OCFL
- ▶ Web components for library, archive and museum metadata types
- ▶ Extend Newt through WASI+WASM run time modules and expose to use in pipelines
- ▶ WASI+WASM might be useful to conserve ports taken up in the data pipelines

## Related resources

- ▶ Newt <https://github.com/caltechlibrary/newt>
- ▶ Dataset + datasetd <https://github.com/caltechlibrary/dataset>
- ▶ [Handlebars](#) programming languages support

# Thank you!

- ▶ This Presentation
  - ▶ pdf: <https://caltechlibrary.github.io/newt/presentation3/newt-p3.pdf>
  - ▶ pptx: <https://caltechlibrary.github.io/newt/presentation3/newt-p3.pptx>
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