

INQUIREX

Deterministic meets Probabilistic

TO POWER A SMART FORM COPILOT

Ask the right questions. Skip the rest.

Konstantin Gredeskoul — April 2026

For SFRuby ❤️

The Problem

- You need to qualify leads, onboard users, or collect structured intake data
- The questions you ask depend on the answers to the previous questions
- Some forms are very long and users give up...

Example – Tax Preparer Site: Intake Form

INFO

Tax preparer might want to understand the level of complexity of your taxes before you even get on the phone. Moreover, you might want to know the price range of their help.

- A simple W-2 filer → only 8 qualifying questions
- A complex business filer → 17-27 questions

Same form, Radically different paths.

Example with Branching



What Exists Today

CATEGORY	GEMS	GAP
State machines	AASM, Statesman	Model object lifecycle, not questionnaires
Form wizards	Wicked, FormWizard	Linear steps — no conditional branching
Workflow engines	FlowCore	Orchestration, not user-facing Q&A
Rules engines	Ruleby, Wongi	Pure inference — no flow, no answers
Survey gems	Surveyor	Basic skip logic, no composable rules

After Extensive Research, Today Nothing Combines:

★ IMPORTANT

A declarative DSL that defines a questionnaire as a graph with verbs as nodes, with AST branching and transition rules as edges, with Automatic Accumulators based on the answers, and, speaking of answers — Typed and Validated Answers. And, on top of it — With JSON serialization of both the form definition and the answers. Not to mention: **modern LLM capabilities!**

The Core Concept

A qualifying questionnaire is a nothing but a **directed graph** where:

- **Nodes** are steps with verbs: **ask**, **say**, **header**, **btw**, **warning**, **confirm**
- **Edges** are transitions with **AST-based rule conditions**
- **The Engine** walks the graph, collects **typed answers**, tracks history
- **Everything serializes to JSON** — same flow in terminal, browser, or mobile

Now: The Big Idea

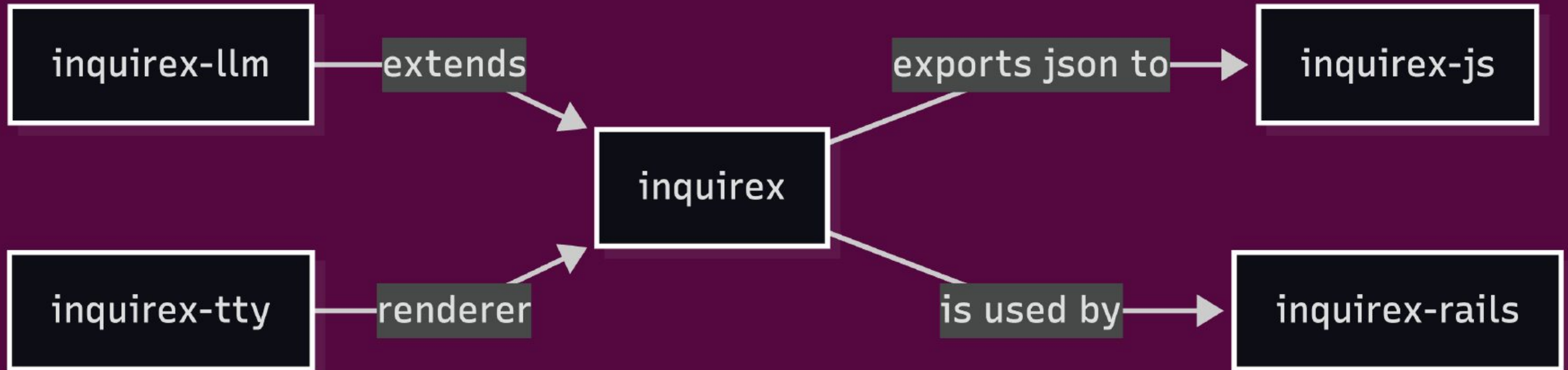
WHAT IF WE COMBINE DETERMINISTIC DSL WITH PROBABILISTIC LLM?

- Perhaps we can shortcut the long line of questioning by asking the user to describe the topic in their own words?
- The combination of deterministic question flow, typed answers, decoupled rendering for each platform, and (most importantly) LLM's ability to extract structured answers from the free-form text is the primary innovation of this technology.

The Main Insight

1. DSL defines what data you need — (deterministic, typed, validated)
2. LLM extracts what it can — (probabilistic, from free text)
3. Engine asks only what's left — (skip_if + rule evaluation)

The Gem Ecosystem



Base Gem

INQUIREX

<https://github.com/inquirex/inquirex>

THE CONVERSATIONAL DSL

```
Inquirex.define id: "tax-intake", version: "1.0.0" do
  start :filing_status

  ask :filing_status do
    type :enum
    question "What is your filing status?"
    options single: "Single", married_jointly: "Married Filing Jointly"
    widget target: :desktop, type: :radio_group, columns: 2
    transition to: :dependents
  end

  ask :dependents do
    type :integer
    question "How many dependents?"
    default 0
    transition to: :income_types
  end
end
```

11 Typed Data Types

TYPE	WIDGET	EXAMPLE
<code>:string</code>	Text input	<code>"John Doe"</code>
<code>:text</code>	Textarea	<code>"So, here is my tax situation"</code>
<code>:integer</code>	Number input	<code>3</code>
<code>:decimal</code>	Number input	<code>45000.50</code>
<code>:currency</code>	Currency input	<code>12500.00</code>
<code>:boolean</code>	Toggle / Yes-No	<code>true</code>

TYPE	WIDGET	EXAMPLE
<code>:enum</code>	Radio / Dropdown	<code>["Married, Filing Jointly", ..]</code>
<code>:multi_enum</code>	Checkboxes	<code>["W2", "Business", ..]</code>
<code>:date</code>	Date picker	<code>"2025-04-15"</code>
<code>:email</code>	Email input	<code>"alice@example.com"</code>
<code>:phone</code>	Phone input	<code>" +1-555-123-4567"</code>

AST-Based Rules (Serializable!)

```
# Atomic rules
contains(:income_types, "Business")
equals(:status, "married_jointly")
greater_than(:business_count, 2)

# Composable — nest without limit
transition to: :complex_review,
  if_rule: all(
    equals(:filing_status, "married_jointly"),
    any(
      greater_than(:business_count, 3),
      contains(:income_types, "Rental")
    )
  )
)
```

Rules are **AST objects**, not procs. They serialize to JSON.
The JS widget evaluates them **client-side**. Zero latency.

Accumulators: Running Totals

```
accumulator :price,      type: :currency, default: 0
accumulator :complexity, type: :integer,  default: 0

ask :filing_status do
  type :enum
  options single: "Single", mfj: "Married Filing Jointly"
  price single: 200, mfj: 400          # sugar for accumulate :price
  accumulate :complexity, lookup: { mfj: 1 }
end

ask :schedules do
  type :multi_enum
  options c: "Schedule C", e: "Schedule E", d: "Schedule D"
  price per_selection: { c: 150, e: 75, d: 50 }
  accumulate :complexity, per_selection: { c: 2, e: 1, d: 1 }
end
```

Pure data. Serializes to JSON. Same totals server-side and client-side.

JSON Serialization: The Bridge

```
{
  "id": "tax-intake-2025",
  "start": "filing_status",
  "accumulators": {
    "price": { "type": "currency", "default": 0 }
  },
  "steps": {
    "filing_status": {
      "verb": "ask",
      "type": "enum",
      "question": "What is your filing status?",
      "widget": {
        "desktop": { "type": "radio_group", "columns": 2 }
      },
      "accumulate": {
        "price": { "lookup": { "single": 200, "mfj": 400 } }
      },
      "transitions": [
        { "to": "dependents" }
      ]
    }
  }
}
```

The Traditional Flow

Q1: Filing status?	→ married_jointly
Q2: Dependents?	→ 2
Q3: Income types?	→ [W2, Business, Rental]
Q4: How many businesses?	→ 1
Q5: Business details?	→ ...
Q6: Rental details?	→ ...
Q7: State?	→ California
Q8: Contact info?	→ ...

8+ clicks, one question at a time.

The LLM-Enhanced Flow (1/2)

Step 1: User types one paragraph:

"I'm married filing jointly, we have two kids. I work at Google on a W-2 but my wife has an LLC doing consulting and a rental property in Oakland. We also have crypto on Coinbase. California."

The LLM-Enhanced Flow (2/2)

Step 2: **clarify** verb sends it to Claude:

```
clarify :extracted do
  from :tell_me
  prompt "Extract structured tax information."
  schema filing_status: :string,
          dependents:    :integer,
          income_types:  :array,
          business_count: :integer
  model :claude_sonnet
  temperature 0.1
end
```

What the LLM Returns

```
{  
  "filing_status": "married_jointly",  
  "dependents": 2,  
  "income_types": ["W2", "Business", "Rental", "Investment"],  
  "business_count": 1,  
  "has_crypto": true,  
  "has_rental": true,  
  "state": "california"  
}
```

7 answers extracted from 1 paragraph.

The engine now `skip_if not_empty(...)` on those questions.

Only asks what the LLM couldn't infer

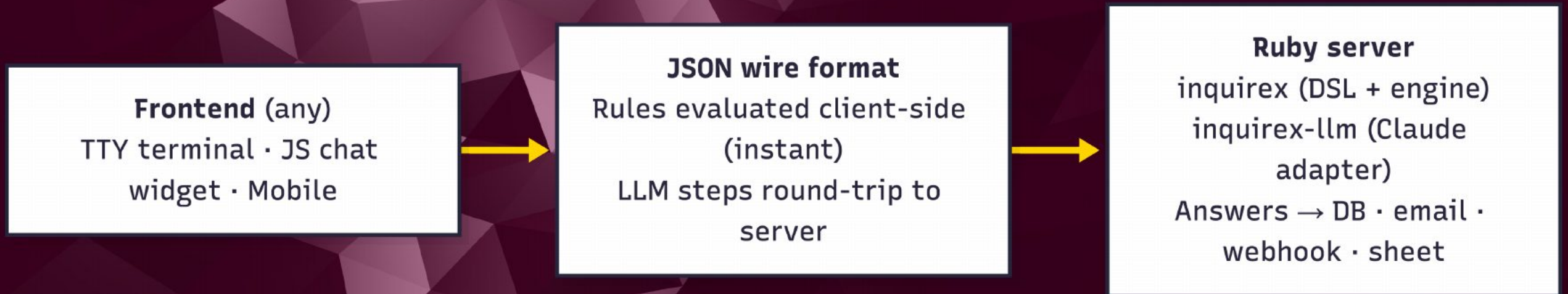
Four LLM Verbs

VERB	PURPOSE
<code>clarify</code>	Extract structured data from free text
<code>describe</code>	Generate natural language from structured data
<code>summarize</code>	Summarize all/selected answers
<code>detour</code>	Dynamically generate follow-up questions

All require `schema` declarations. All validate output.

All marked `requires_server: true` in JSON.

The Architecture



★ IMPORTANT

Shadow DOM → zero style conflicts with the host site (using the [Lit](#) JS library)

The Widget: One Script Tag

```
<script src="https://qualified.at/inquirex.js"  
  data-flow-url="https://qualified.at/sites/989aed50-1ced-013f-f93f-66219a96f4e3"  
  data-auth-sha="6de989b32cb10f2361ddaa46ea917a674429b4c6"  
</script>
```

- **GET `https://qualified.at/flows/:uuid`** is the flow URL → flow JSON
 - We'll refer to this URL as **`flow-url`**
 - JS Renders floating chat bubble (can auto-open, or not)
 - Evaluates rules **client-side** → instant transitions
 - Rules with **`requires_server: true`** → POSTS to **`{flow-url}/llm/:verb`**
 - When no more questions remain, performs a **POST `{flow-uri}`**
 - Sending completed answers as JSON (in dev mode can preview JSON)



Live Demo

★ IMPORTANT

For those watching the slides, see the asciinema screencasts in the READMEs for the `inquirex-tty` and `inquirex-js` gems.

The Next Steps

★ IMPORTANT

Gems → MIT-licensed, free forever

<https://qualified.at> → a mini SaaS product to be launched Q2 2026.

Basic usage will be free.

Paid Features Might Include

- DSL auto-generator using LLM (describe the questions you want to ask)
- Account management, multi-site support with CORS enabled
- Hosted flow definitions + widget serving (via CDN)
- DB store for answer JSON, potential email notifications, or webhooks with answers
- Analytics: completion rates, drop-off points, path distribution, etc.

The gems are the engine. [Qualified.at](#) is the car.

Use Cases Beyond Tax

DOMAIN	WHAT THE DSL DEFINES
Tax preparation	Client intake + pricing
Loan application	Eligibility screening
Job qualification	Candidate screening
Insurance quoting	Risk assessment + premium calc
SaaS onboarding	Feature qualification + plan suggestion
Medical intake	Patient history + triage
Legal consultation	Case qualification

Same engine

Different flow definitions

COMPLETELY DIFFERENT DOMAINS OR APPLICATIONS

Current Stats

GEM	SPECS	COVERAGE
<code>inquirex</code> (core)	220	~94%
<code>inquirex-llm</code>	111	✓
<code>inquirex-tty</code>	✓	✓
<code>inquirex-js</code>	TypeScript	49KB bundle

- Ruby 4.0.2, Zero production dependencies in core
- Accumulators for pricing/scoring each answer

Thank You

Download Gems

RubyGems.org OR github.com/inquirex

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