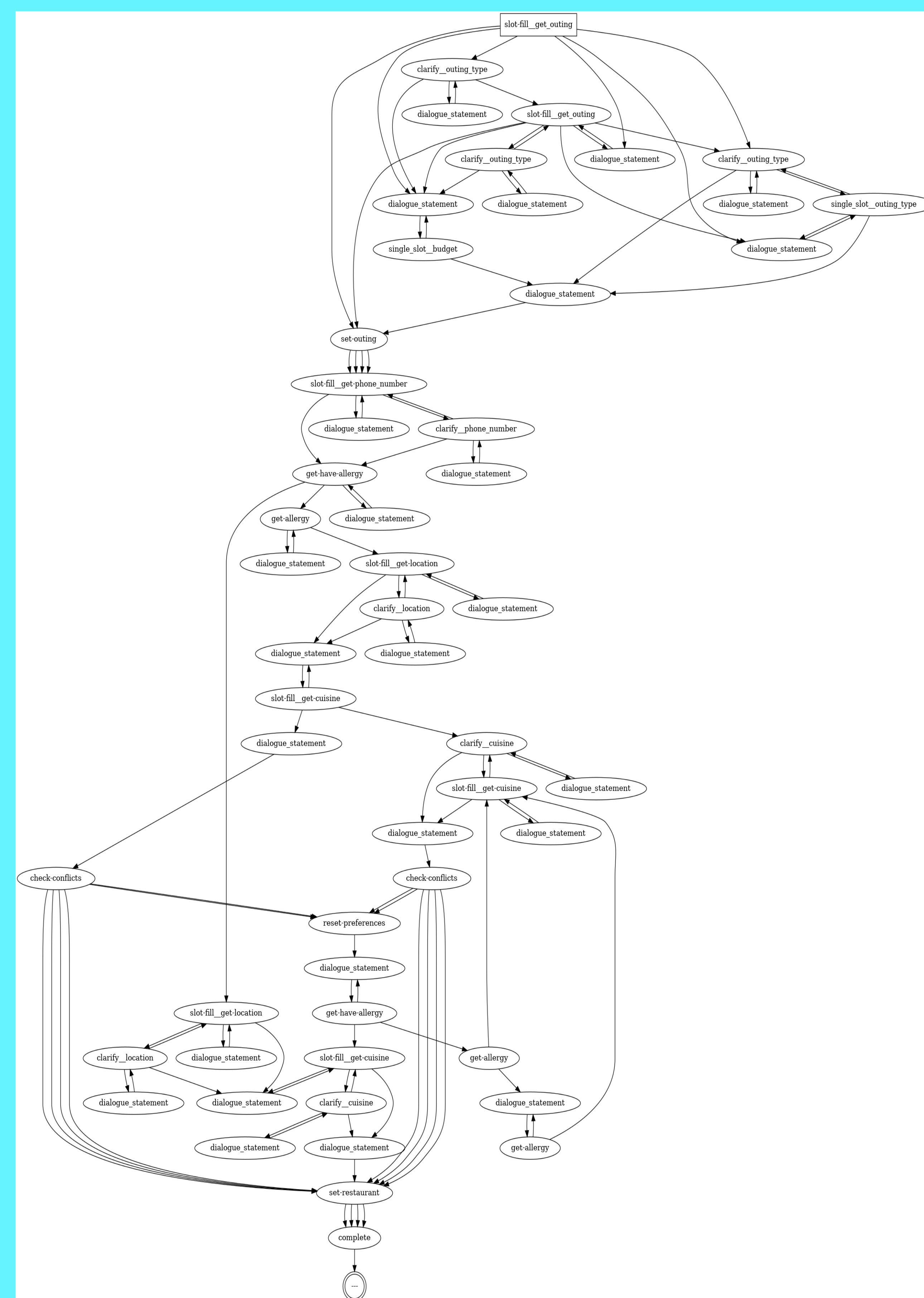
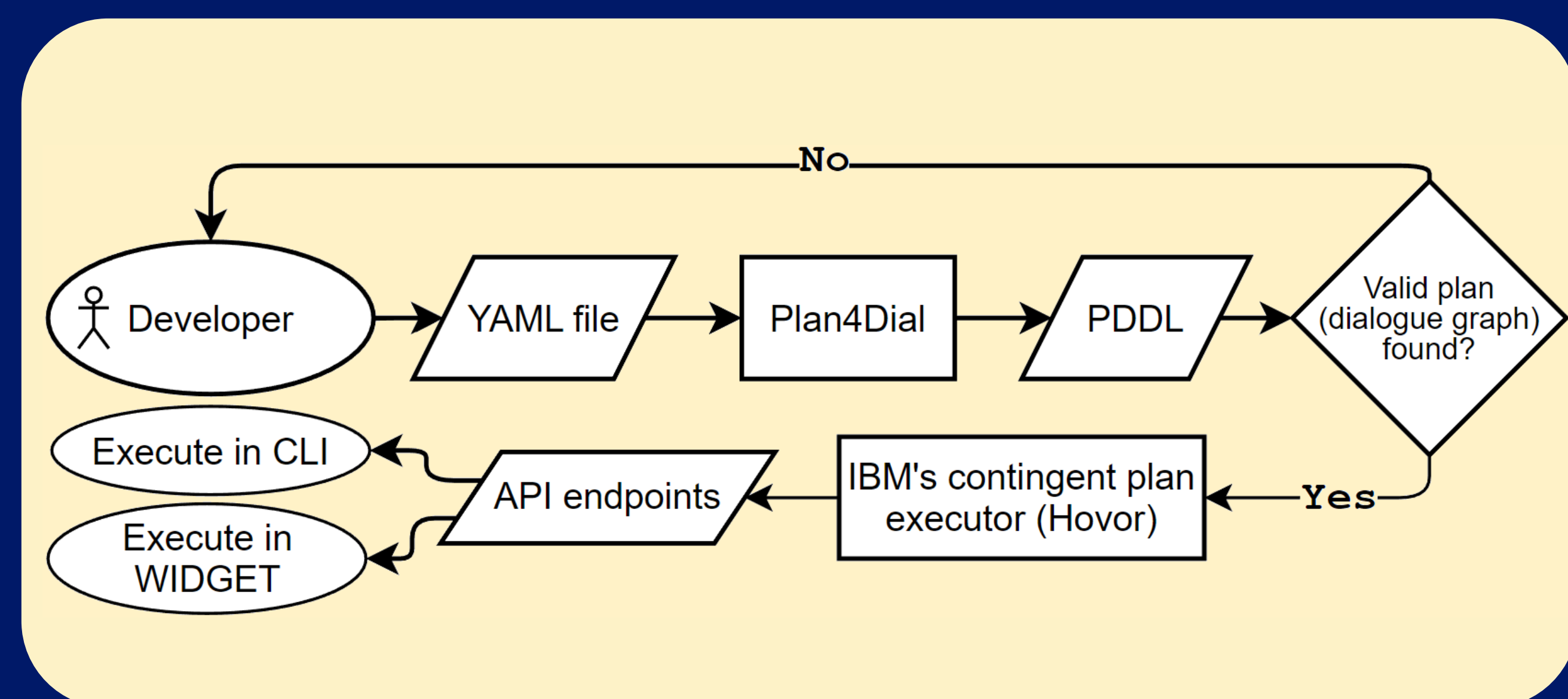
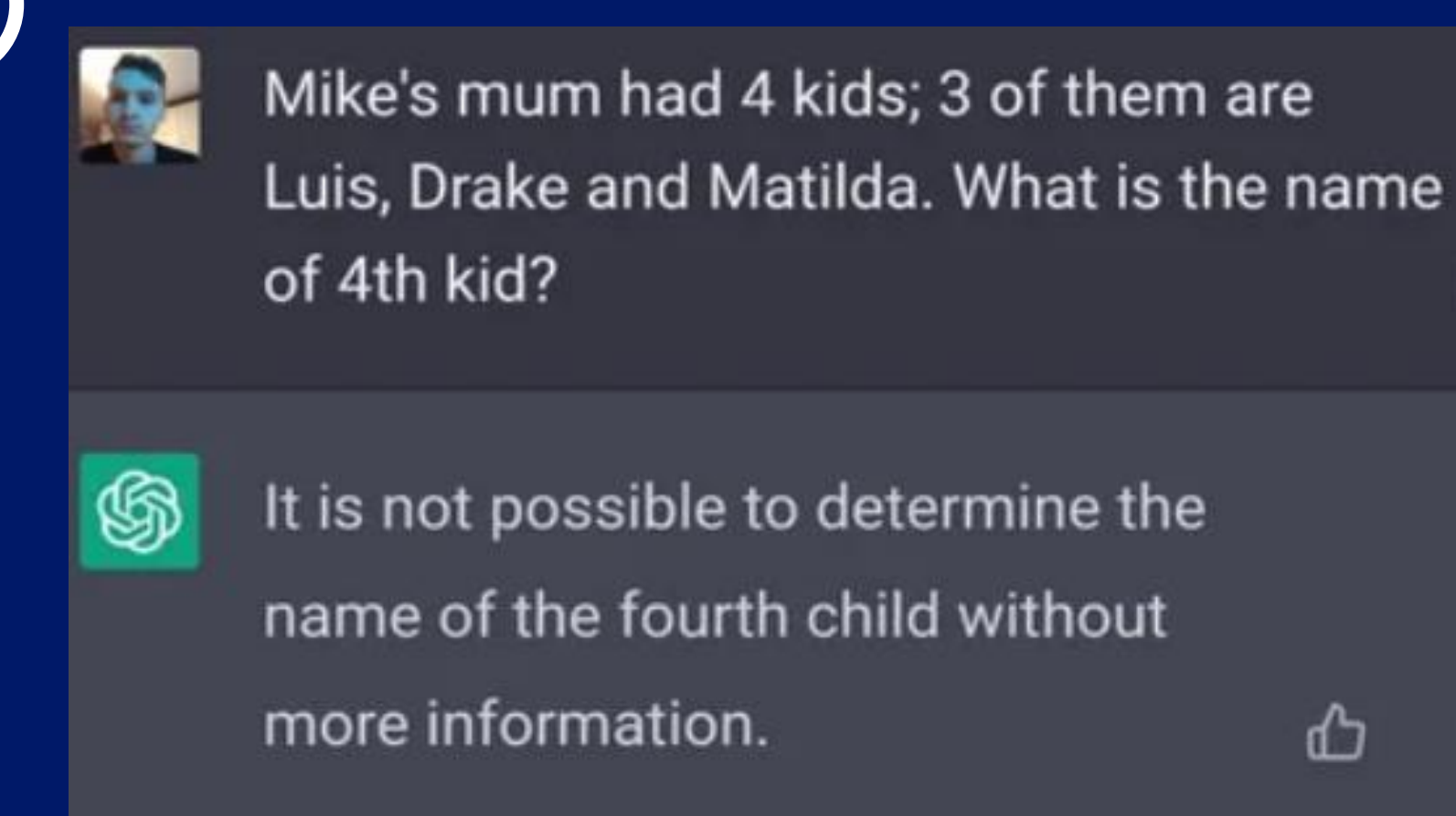


# PLAN4DIAL

## Dialogue Planning Framework



Dialogue planning uses FOND planning to generate dialogue graphs from PDDL, ensuring fully-explainable agents.



End-to-end neural dialogue agents are unpredictable and can fail in some reasoning tasks.

bit.ly/3OysYXR

```
actions:
  get-have-allergy:
    type: dialogue
    message_variants:
      - Do you have any allergies?
    condition:
      have_allergy:
        known: false
    effect:
      set-allergy:
        oneof:
          outcomes:
            indicate_allergy:
              updates:
                have_allergy:
                  value: true
                  known: true
                  intent: confirm
              follow_up: get-allergy
            indicate_no_allergy:
              updates:
                have_allergy:
                  known: true
                  value: false
                  conflict:
                    known: true
                    value: false
                  intent: deny

context_variables:
  # user's location
  location:
    type: json
    extraction:
      method: spacy
      config_method: gpe
    known:
      type: fflag
      init: false
      options:
        Toronto:
          variations:
            - downtown
            Kingston:
              variations:
                - k-town
  # does the user have an allergy?
  have_allergy:
    type: flag
    init: false
    known:
      type: flag
      init: false
  # allergies to take into account
  food_restriction:
    type: enum
    known:
      type: flag
      init: false
      options:
        - dairy-free
        - gluten-free

intents:
  confirm:
    utterances:
      - "yes"
      - yeah
      - "y"
      - mhmm
      - confirm
      - yes please
  deny:
    utterances:
      - "no"
      - not at all
      - that's not what i meant
      - absolutely not
      - nah
      - no thanks
      - no thank you
  share_cuisine:
    entities:
      - cuisine
    utterances:
      - I want to eat $cuisine.
      - Do you have restaurants of type $cuisine?
      - Are there $cuisine restaurants in the area?
```

USER-GENERATED

PLAN4DIAL offers the creation of complex dialogue planning agents through a YAML spec...

```
nlu:
  - examples: "- yes"
  - yeah
  - that's it
  - Y
  - mhmm
  - confirm
  - yes please
  intent: confirm
  - examples: "- \d{10}"
  regex: phone_number
  - examples: "- I live in [downtown]('entity': 'location', 'value': 'Toronto')."
  - I am located in [downtown]('entity': 'location', 'value': 'Toronto').
  - I am located in [Toronto]('entity': 'location', 'value': 'Toronto').
  - I live in [k-town]('entity': 'location', 'value': 'Kingston').
  - I am located in [k-town]('entity': 'location', 'value': 'Kingston').
  - Can you help me find things to do in [downtown]('entity': 'location', 'value': 'Toronto')?
  - I live in [Kingston]('entity': 'location', 'value': 'Kingston').
  - I live in [Toronto]('entity': 'location', 'value': 'Toronto').
  - Can you help me find things to do in [Toronto]('entity': 'location', 'value': 'Toronto')?
  - Can you help me find things to do in [Kingston]('entity': 'location', 'value': 'Kingston')?
  - Can you help me find things to do in [k-town]('entity': 'location', 'value': 'Kingston')?
  - I am located in [Kingston]('entity': 'location', 'value': 'Kingston').
  intent: share_location
```

MACHINE-GENERATED



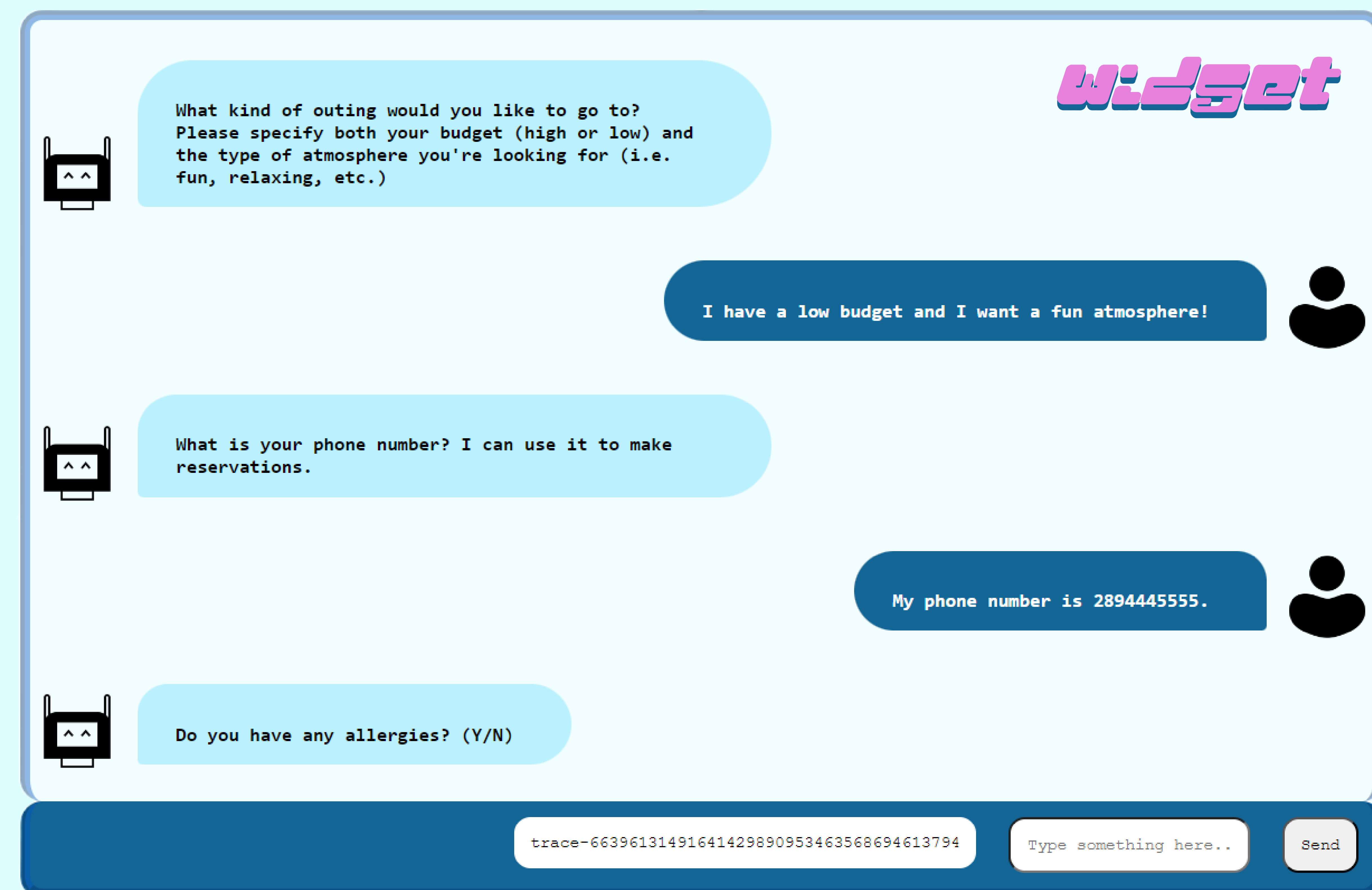
```
(:action get-have-allergy
:parameters()
:precondition
  (and
    (not (forcing_get-allergy))(not (know_have_allergy))
    (not (force-statement)))
  )
:effect
  (labeled-oneof get-have-allergy__set-allergy
  (outcome indicate_allergy
    (and
      (forcing_get-allergy)
      (know_have_allergy)(have_allergy)
    )
  )
  (outcome indicate_no_allergy
    (and
      (know_conflict)(not (conflict))
      (know_have_allergy)(not (have_allergy))
    )
  )
  )
  (outcome fallback (and (force-statement)))
)
```

MACHINE-GENERATED

...which it uses to train an NLU model and generate PDDL (followed by its planner-generated graph). These are then passed to Hovor for chat execution.

Dialogue planning has proven to be effective for creating predictable, task-oriented chatbots, but no readily available modern framework exists. We propose such a framework along with "WIDGET", an embeddable web UI.

Our approach leverages both symbolic and neural AI by using planning for dialogue navigation and an NLU model for extracting user information.



## Other Features

- Custom action templates, outcome determination, and entity extraction
- Results output to API endpoints for your own use
- Conversation saving
- Full dockerization

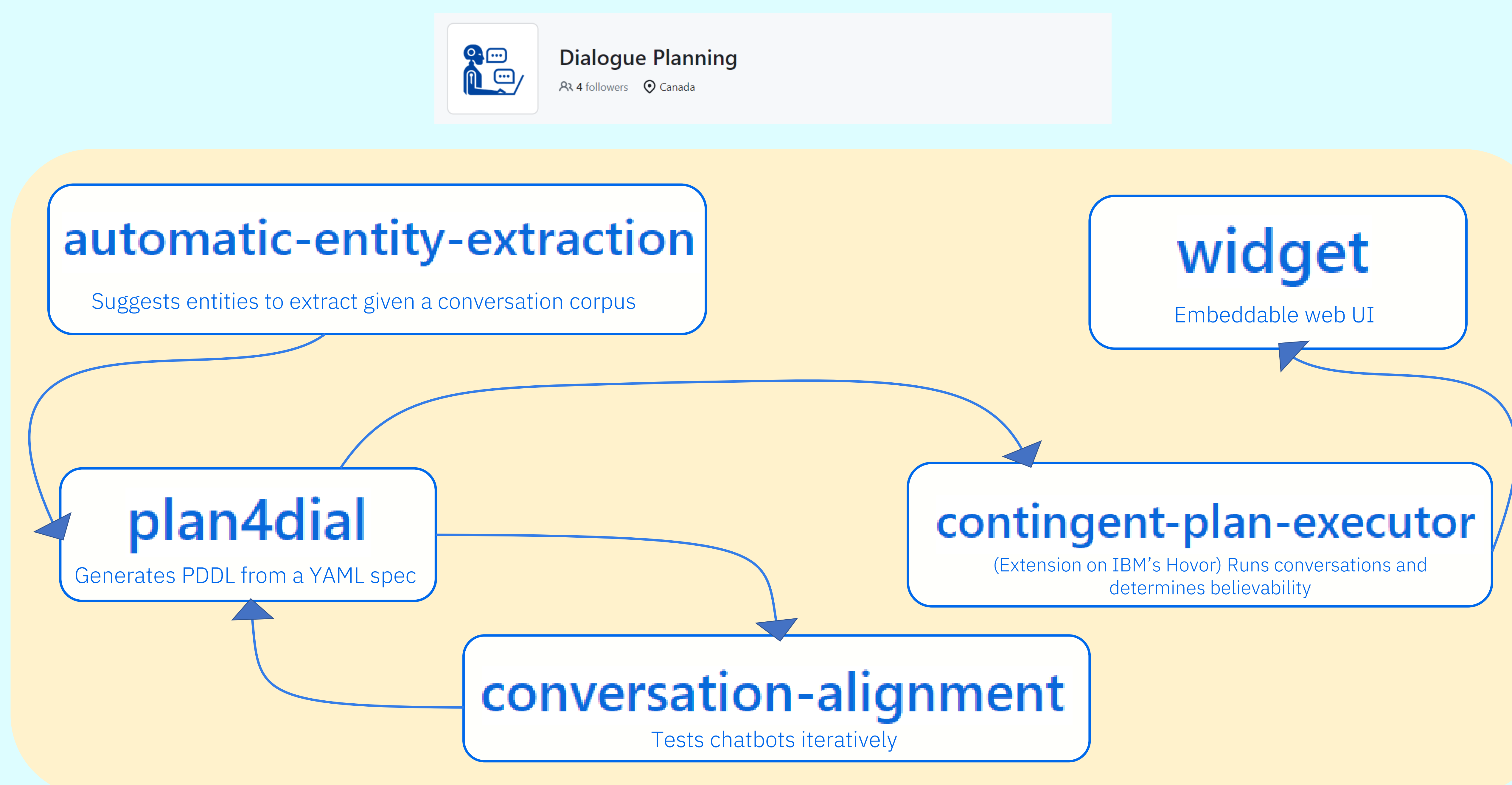
`/new-conversation`

GET:

Begins a new conversation. Returns the agent's message(s) under "msg" and the user's id under "user\_id". Be sure to store the "user\_id" so you can load your conversation later!

## Our Vision

With Plan4Dial as the foundation, we aim to grow into a centralized hub for exploring advancements in dialogue planning. The diagram below displays the execution ordering of our existing systems, with many more to join!



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github.com/dialogue-planning

CONTRIBUTE