

Declare, verify and execute microservices-based process flows with Baker

Scale By the Bay 2017, San Francisco

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Global Financial Institution in Over 40 Countries

Software Company with a Banking License

Microservices Architecture

12. Tandy Radio
Shack TRS-80
Model 100

Our Challenge



Interact with 12 Different Systems



A Flow of 27 Steps



From 2 minutes to 6 hours

A woman with long dark hair is shown from the chest up, set against a dark background. She has her hands raised to her face, with her fingers partially covering her eyes, suggesting distress or despair. Her expression is somber and reflective.

Afraid to Change the Application Code



Functionality Breaks Unexpectedly



Slow Time to Market

How to Turn This Around?







Simplify

Domain Specific Language for
Orchestration Flows

Declarative

Easy to Change



Recipes

Interactions

Ingredients

Events



Communicate

Visualize your code

Non-IT understand as well

Reason About Comfortably



Nikola Kasev
@nikolakasev



Heading to [@ScaleByTheBay](#) to learn from the crème de la crème of the software industry and introduce [#baker](#) there

11:29 PM - 15 Nov 2017

1 Retweet 4 Likes



1



1



4



Tweet your reply



Scale by the Bay @ScaleByTheBay · Nov 15



Replying to [@nikolakasev](#)

We like crepes with cream!



1



Nikola Kasev @nikolakasev · 24h



Will bake





Fruit 'n' Cream Crepes Recipe photo by Taste of Home

FRUIT 'N' CREAM CREPES RECIPE

★★★★★ [Read Reviews \(3\)](#)



Ruth Kaercher, Hudsonville, Michigan, sent this creamy crepes recipe.

Recommended: [Dessert Crepes Recipes](#)

MAKES:

2 servings

TOTAL TIME:

Prep: 20 min. + chilling Cook: 15 min.

[★ RATE](#)

[COMMENT](#)

[SAVE](#)

[PRINT](#)

✓ VERIFIED BY [Taste of Home Test Kitchen](#)

INGREDIENTS

1/3 cup 2% milk

2 tablespoons beaten egg

1/4 teaspoon vanilla extract

1/4 cup all-purpose flour

1-1/2 teaspoons confectioners' sugar

1/4 teaspoon baking powder

DIRECTIONS

- 1 In a small bowl, combine the first seven ingredients. Cover and refrigerate for 1 hour.
- 2 In an 8-in. nonstick skillet, melt 1 teaspoon butter. Stir batter; pour about 2 tablespoons into the center of skillet. Lift and tilt pan to evenly coat bottom. Cook until top appears dry; turn and cook 15-20 seconds longer. Remove to a wire rack. Make 3 more crepes, adding remaining butter to skillet as needed.
- 3 For filling, in a small mixing bowl, beat the cream cheese, 3 tablespoons confectioners' sugar, milk and vanilla until smooth. Spread 1 rounded

Let's Cook Some Crêpes!

Good to Know

Short-lived vs. long-running flows

State is taken care of:

- Cassandra for persistent storage
- Ingredients encrypted by default
- State recovered automatically

When failure occurs:

- Baker retries technical failures with exponential backoff
- Works well with idempotent services
- Deal with functional failure in your recipe

Baker Capability Matrix:

- Investigate not one, not two, but **all business processes** in your company
- Where do you see re-use?
- Map using MoSCoW⁴ to give importance (M = 10, S = 5, C = 2, W = 1)

⁴ https://en.wikipedia.org/wiki/MoSCoW_method

Checking Account

Verify Identity

Register Individual

Open Checking Account

Issue Debit Card

Send Message

Register Ownership

Savings Account

Verify Identity

Register Individual

Open Savings Account

n/a

Send Message

Register Ownership

Customer Onboarding

Verify Identity

Register Individual

n/a

n/a

Send Message

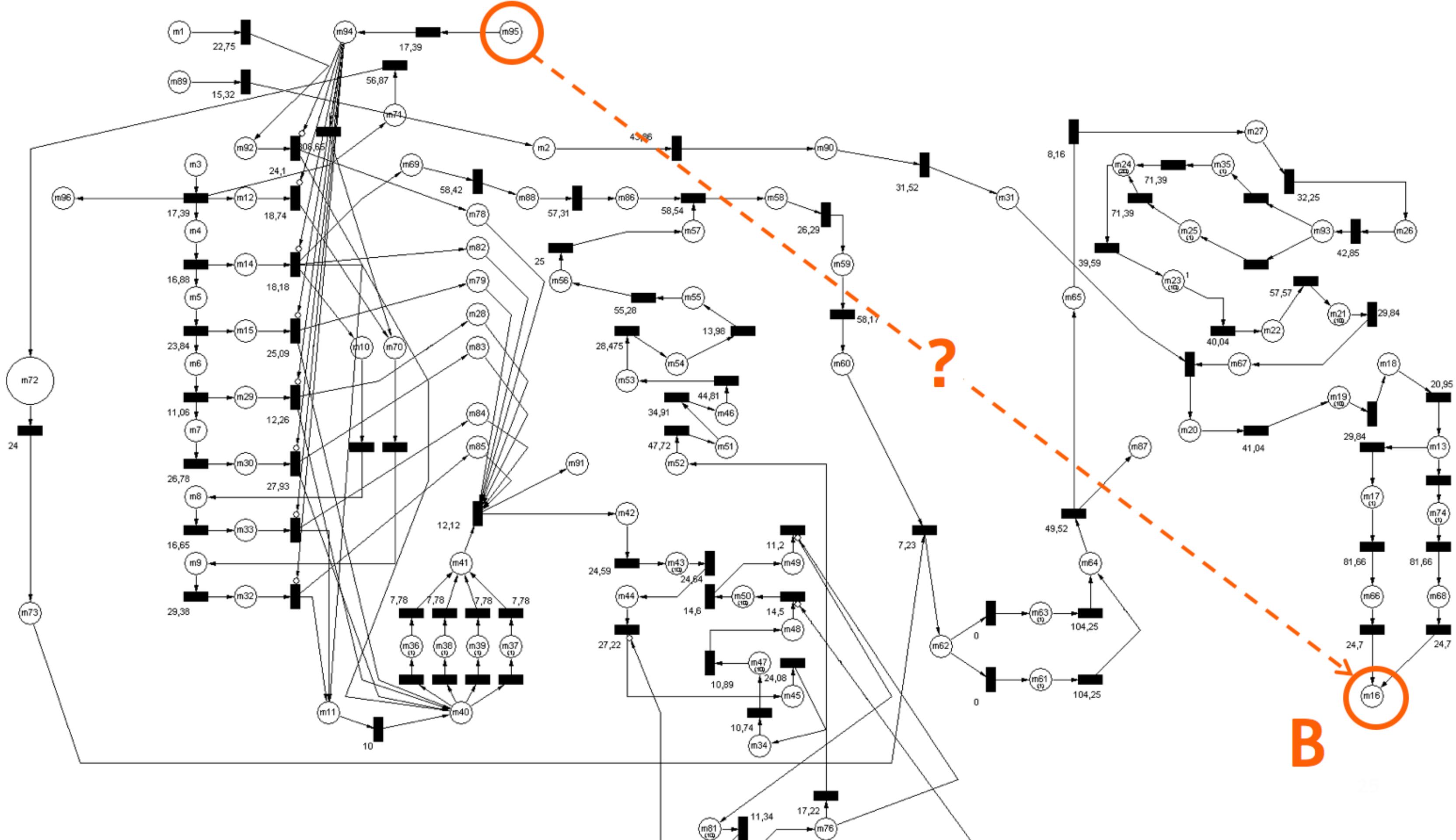
n/a

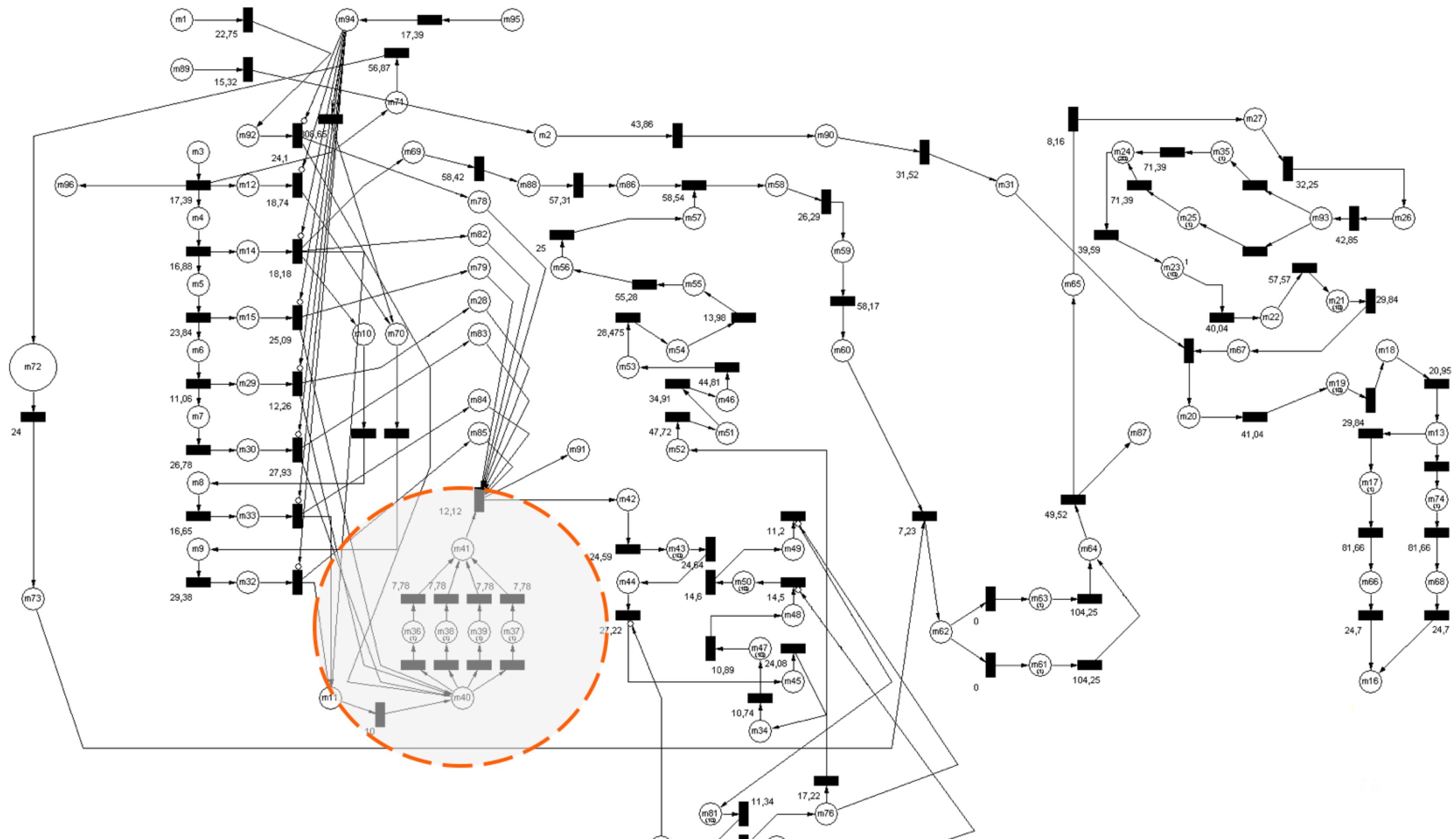
A close-up photograph of a person's hands holding a large, round, brown loaf of bread. The bread has a textured, slightly cracked surface. The hands are wearing light-colored, ribbed sleeves, possibly from an apron. The background is dark and out of focus.

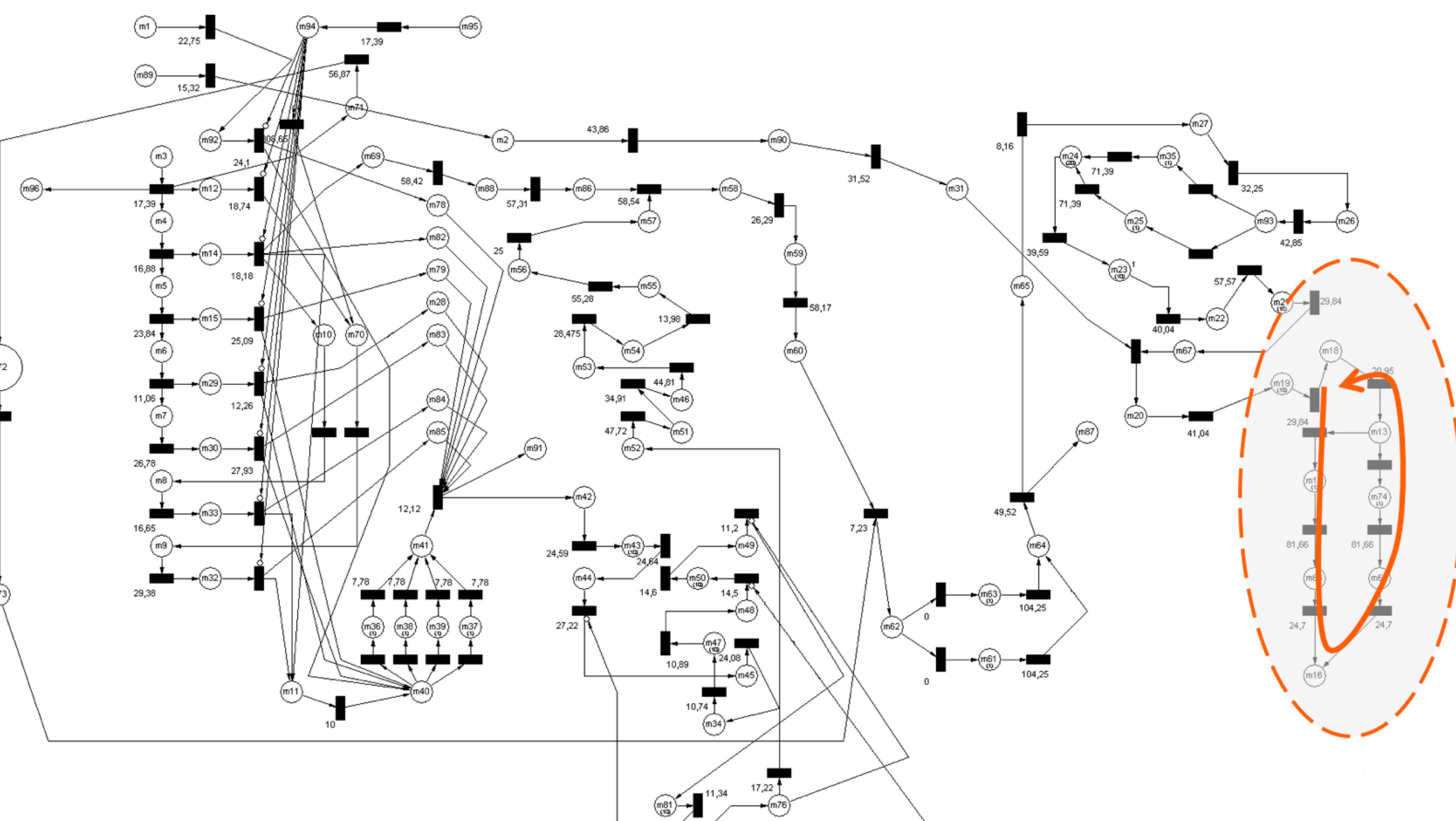
<https://github.com/ing-bank/baker>

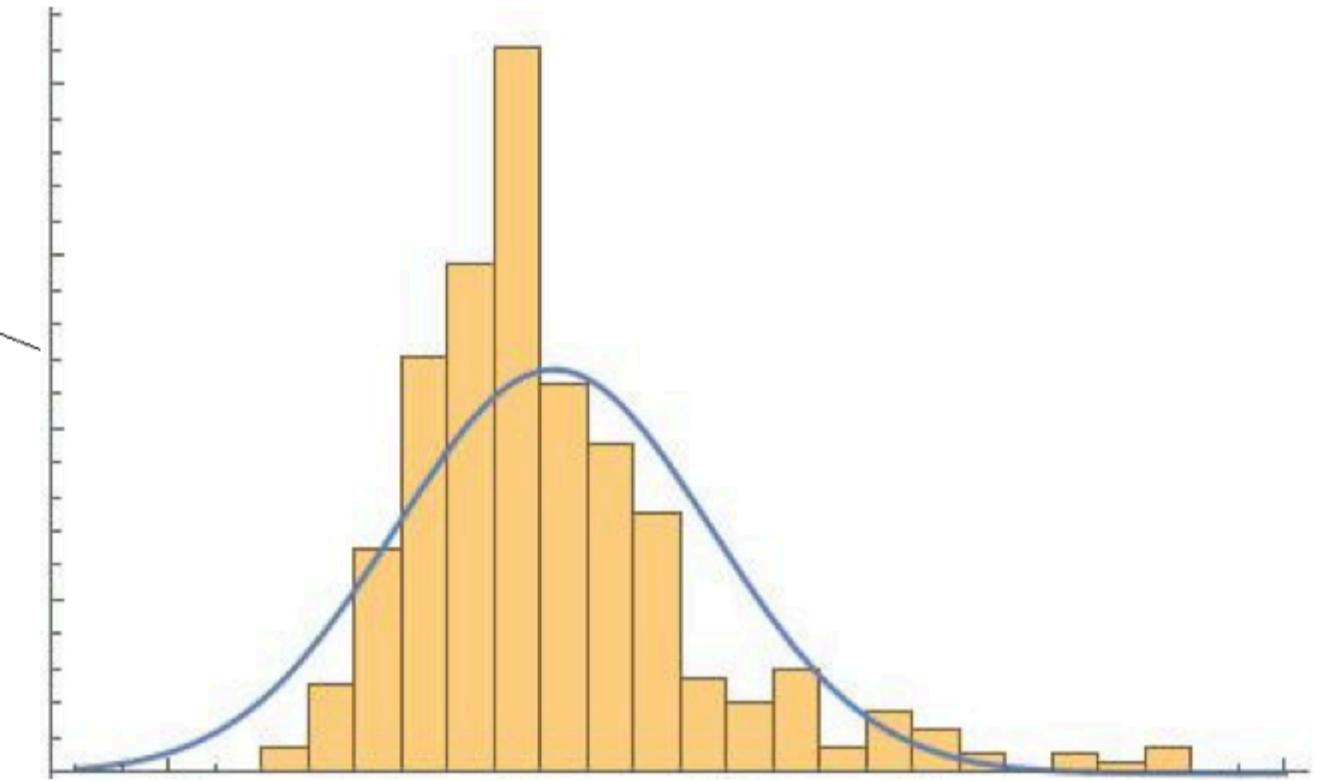
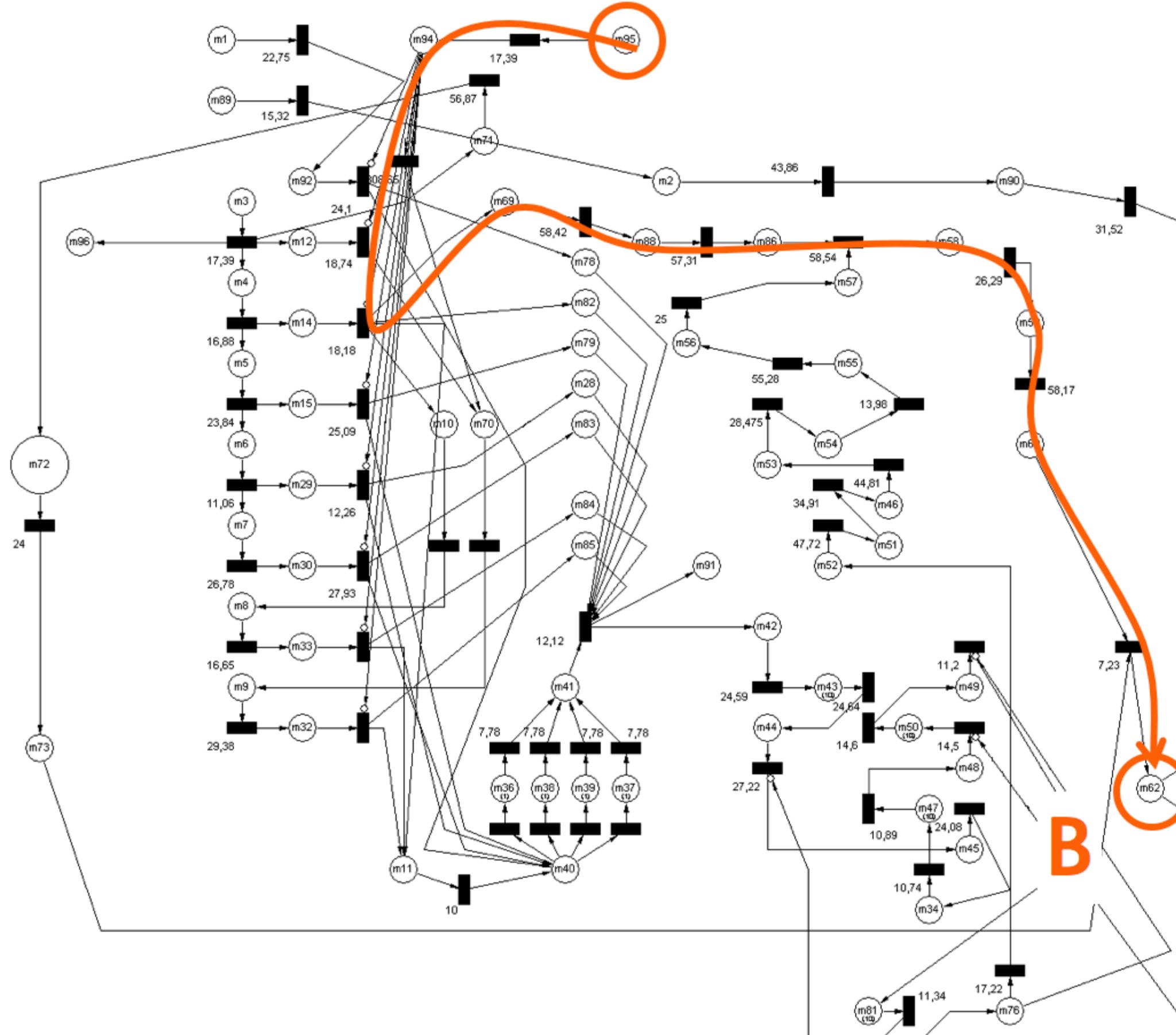
Why Petri net?³

³ https://en.wikipedia.org/wiki/Petri_net

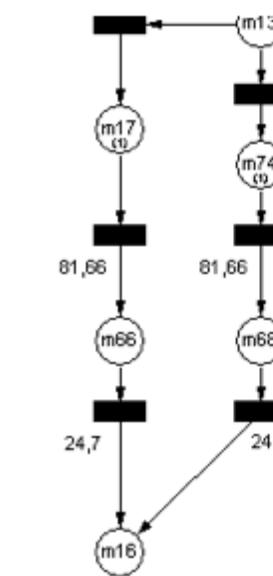
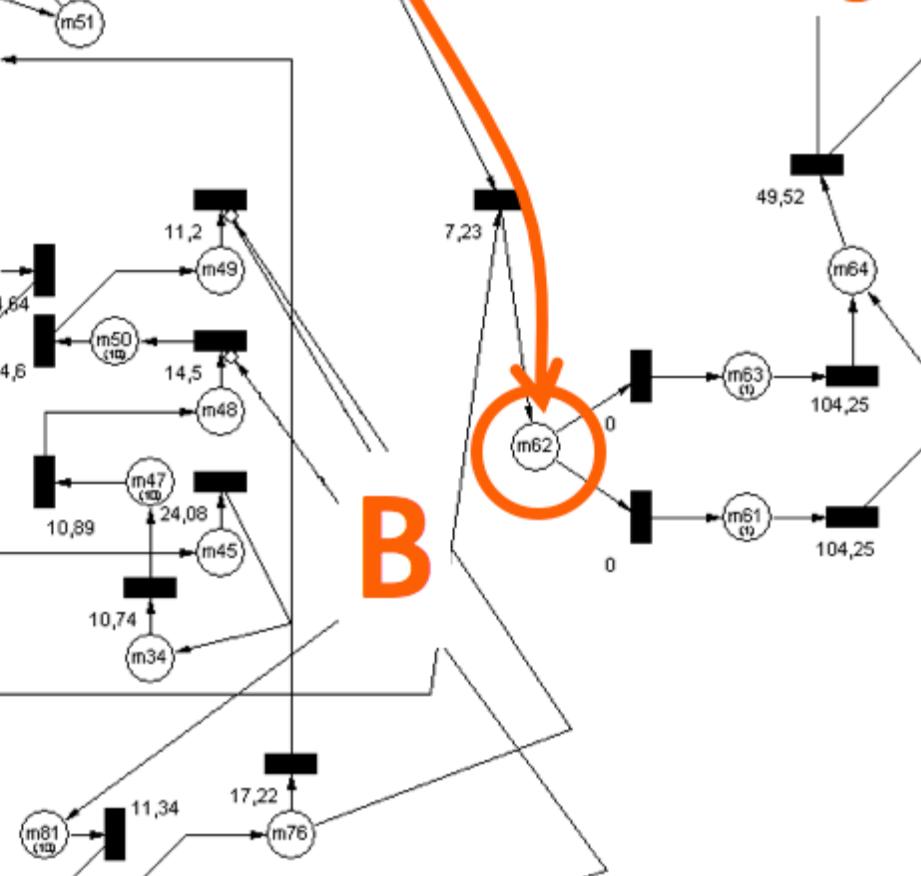




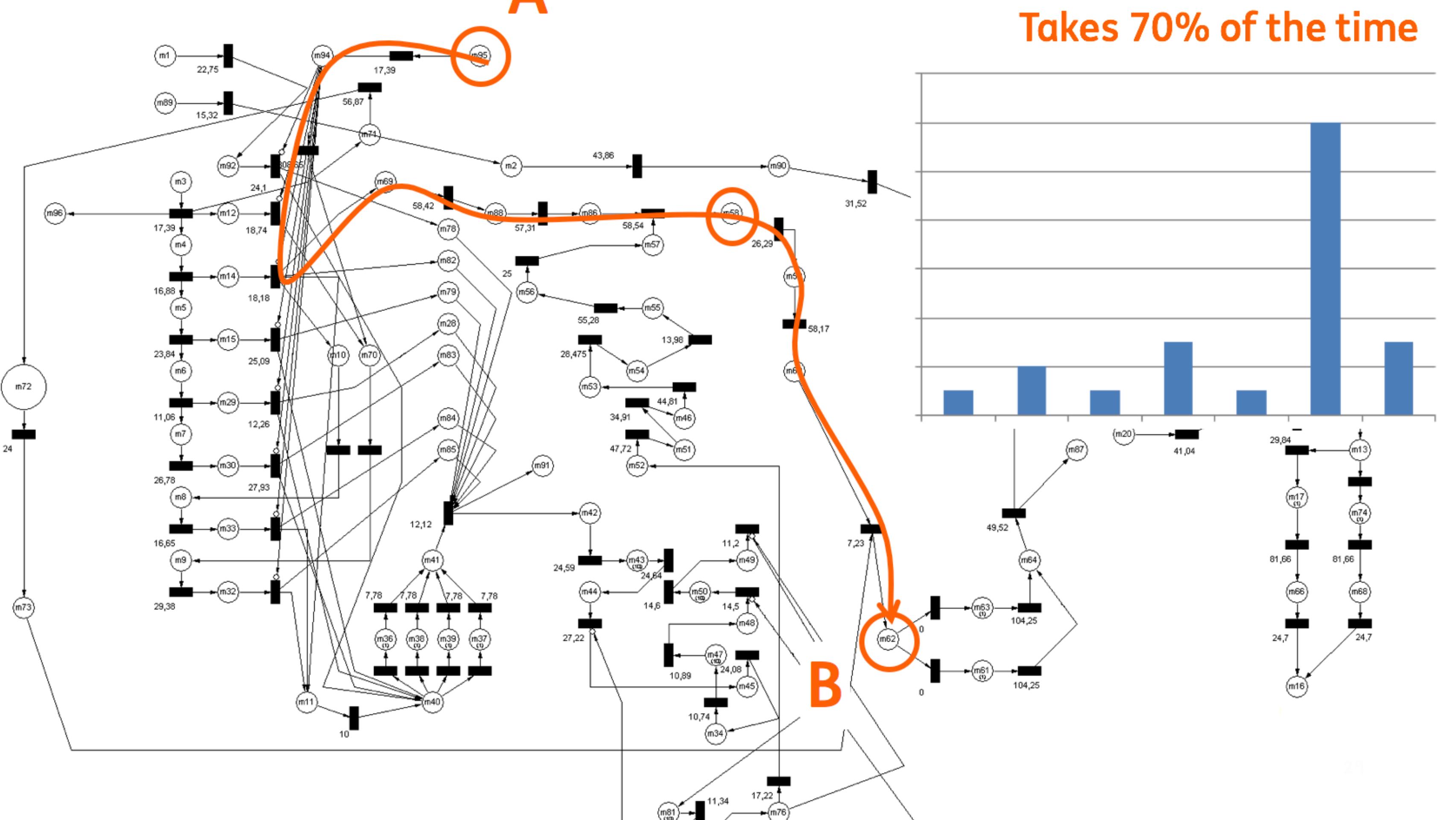


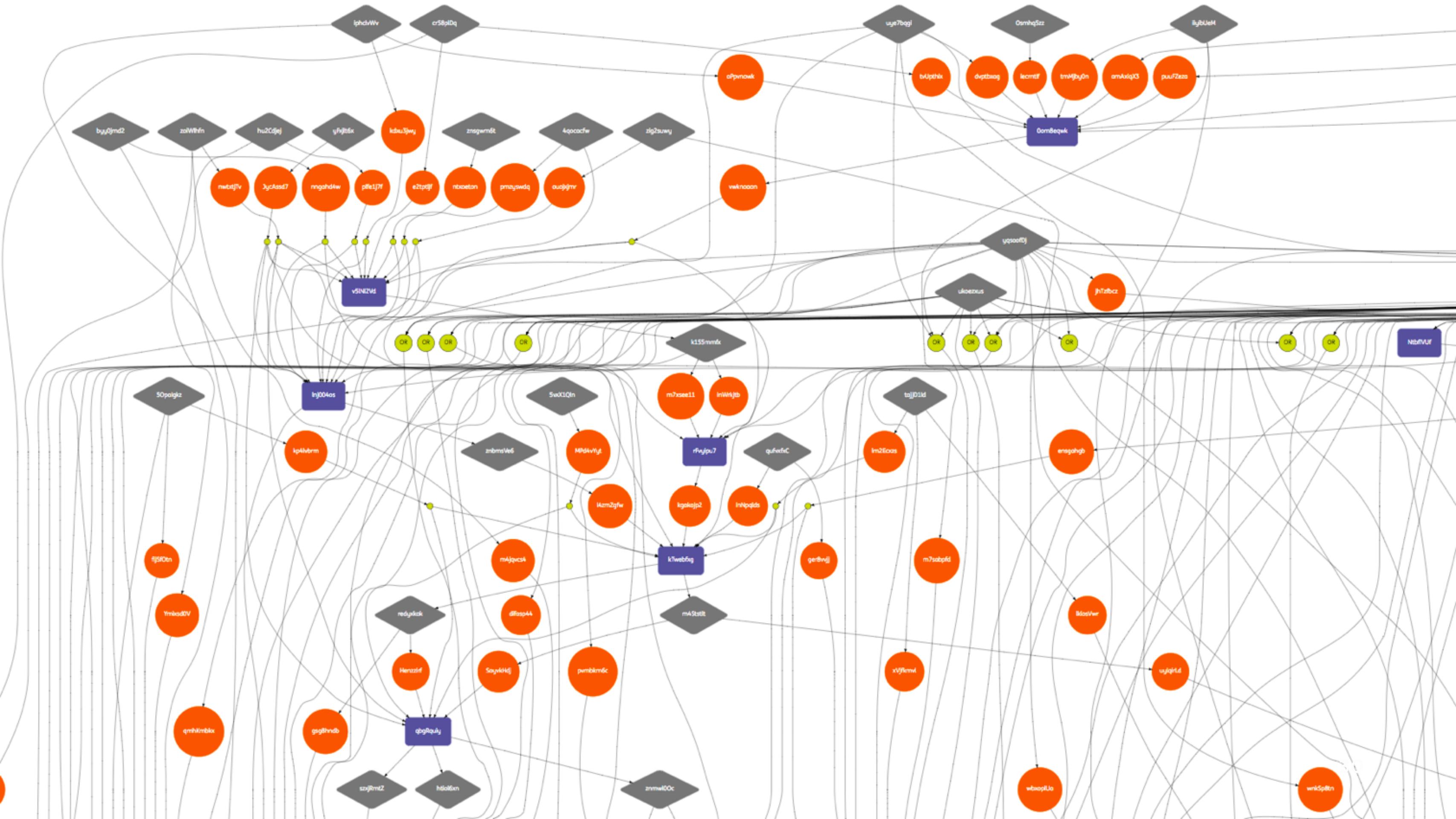
A

Average traversal time: 10 seconds

B

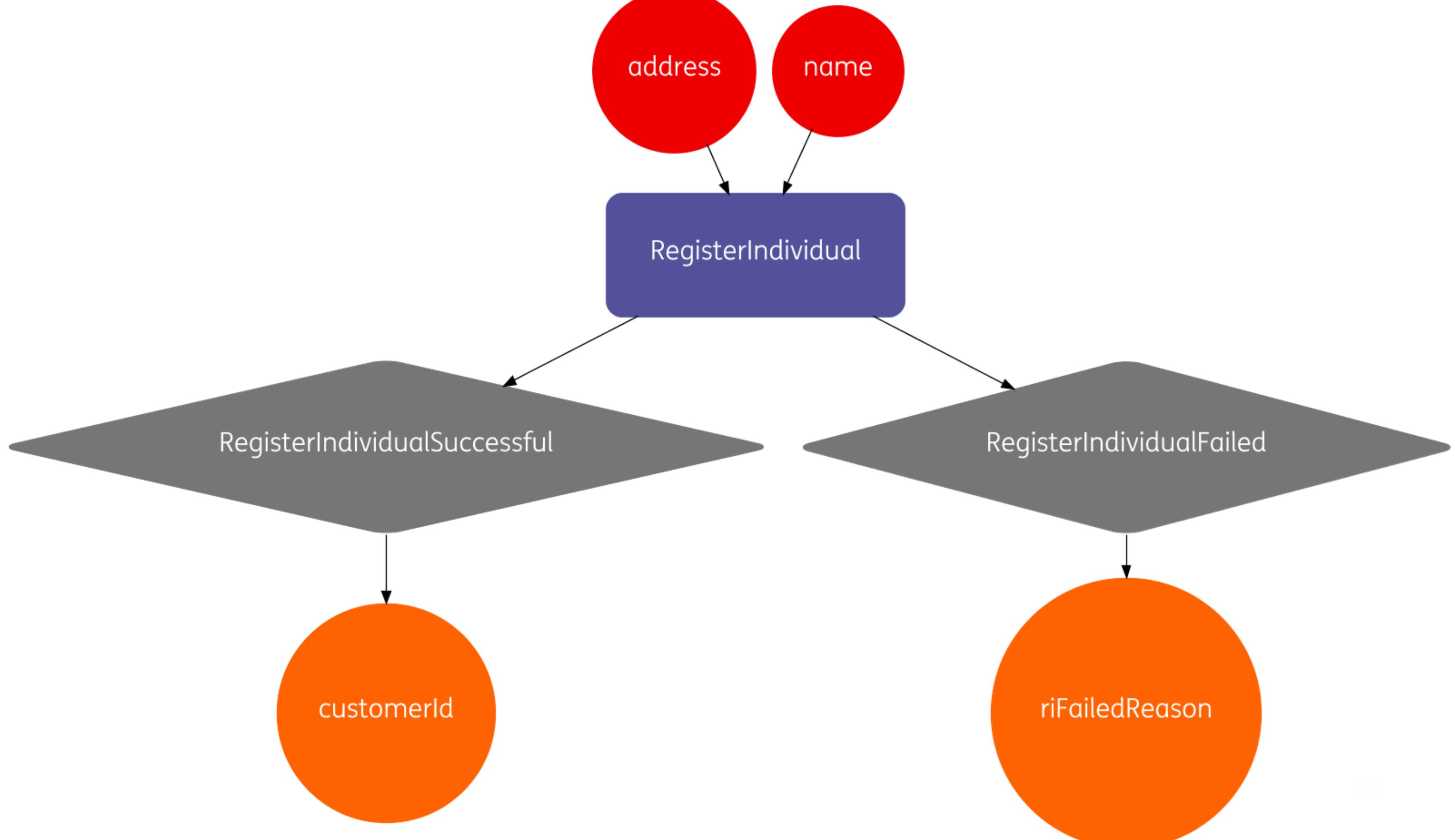
Takes 70% of the time

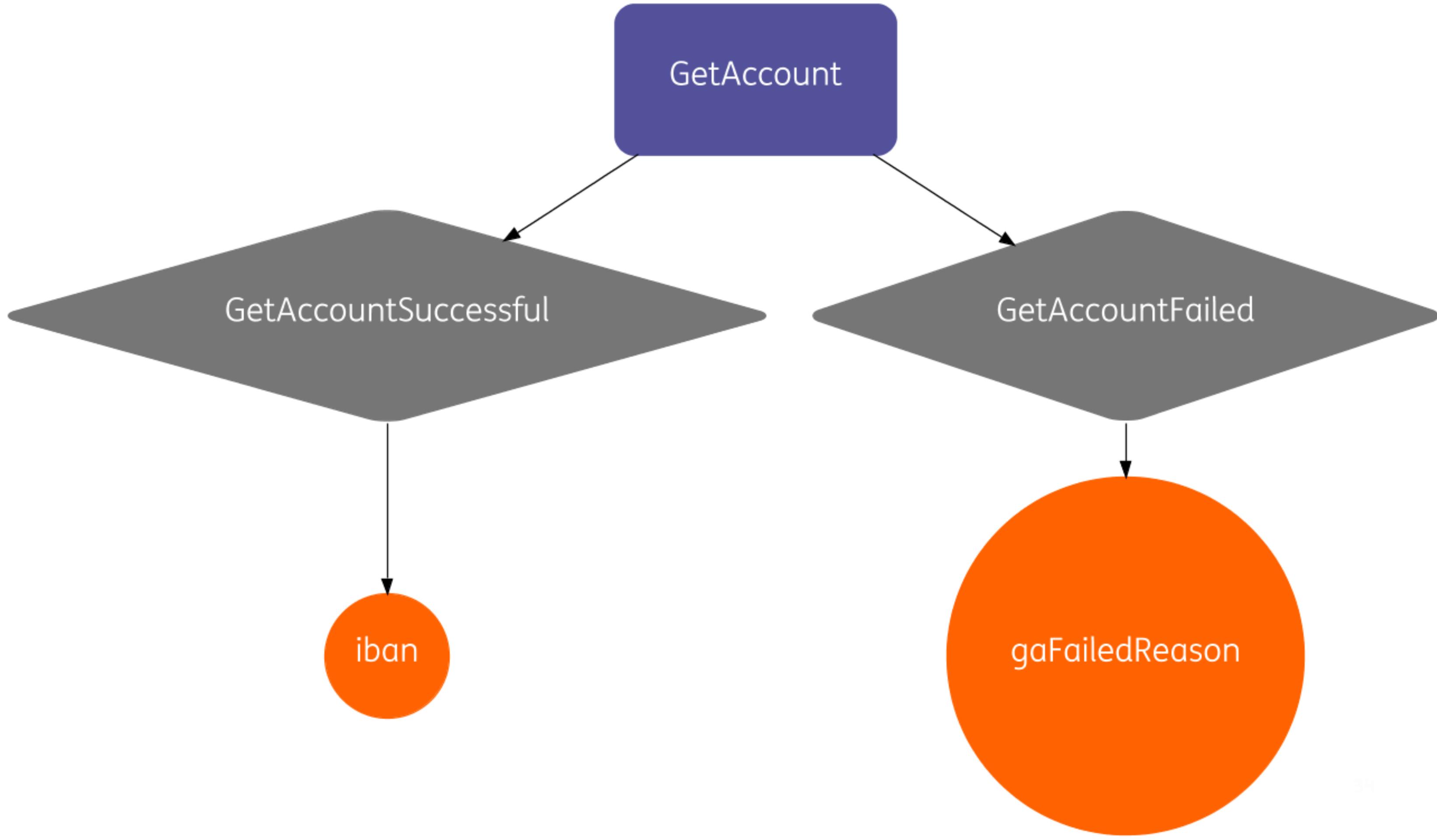


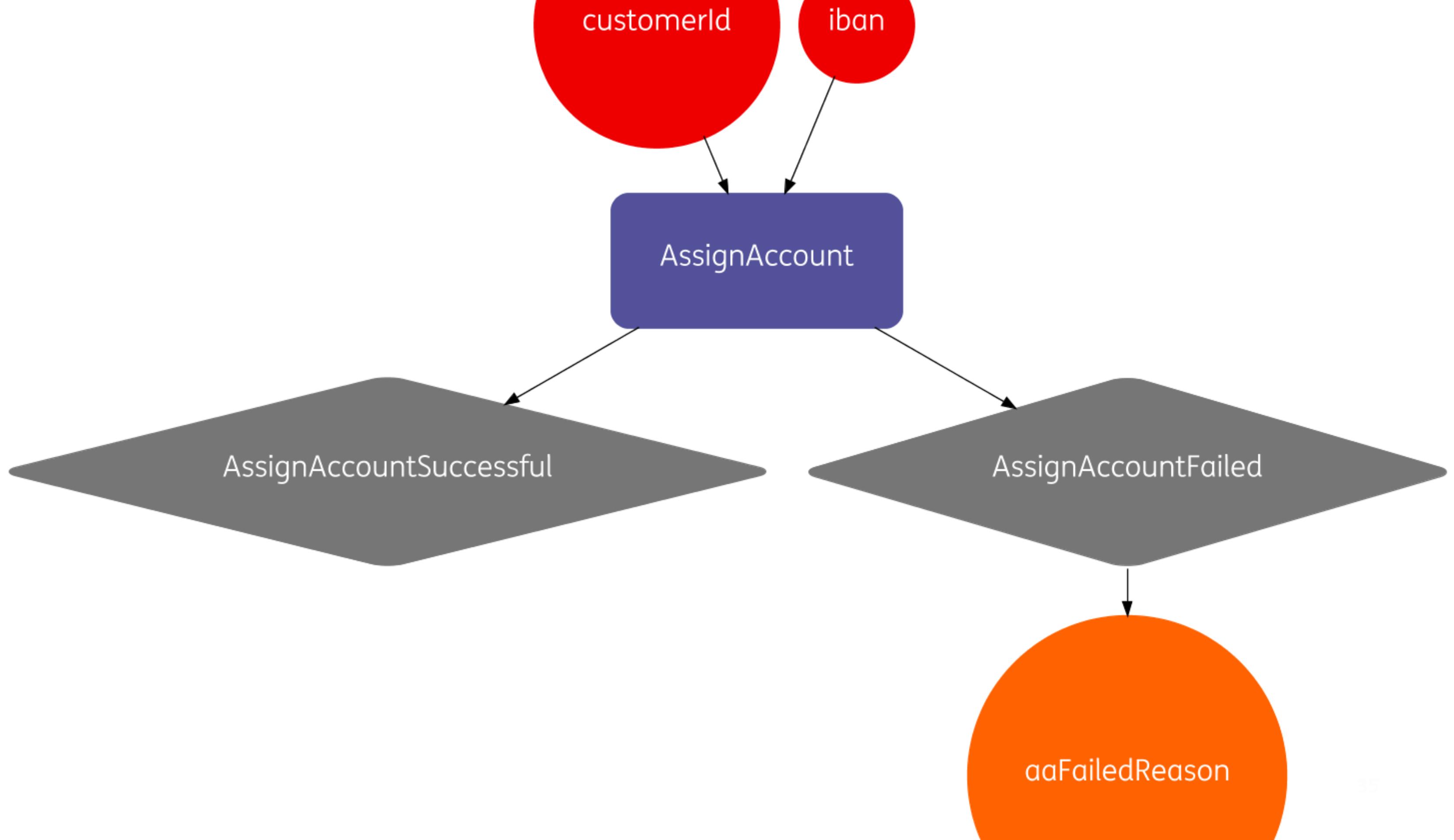


Design-time

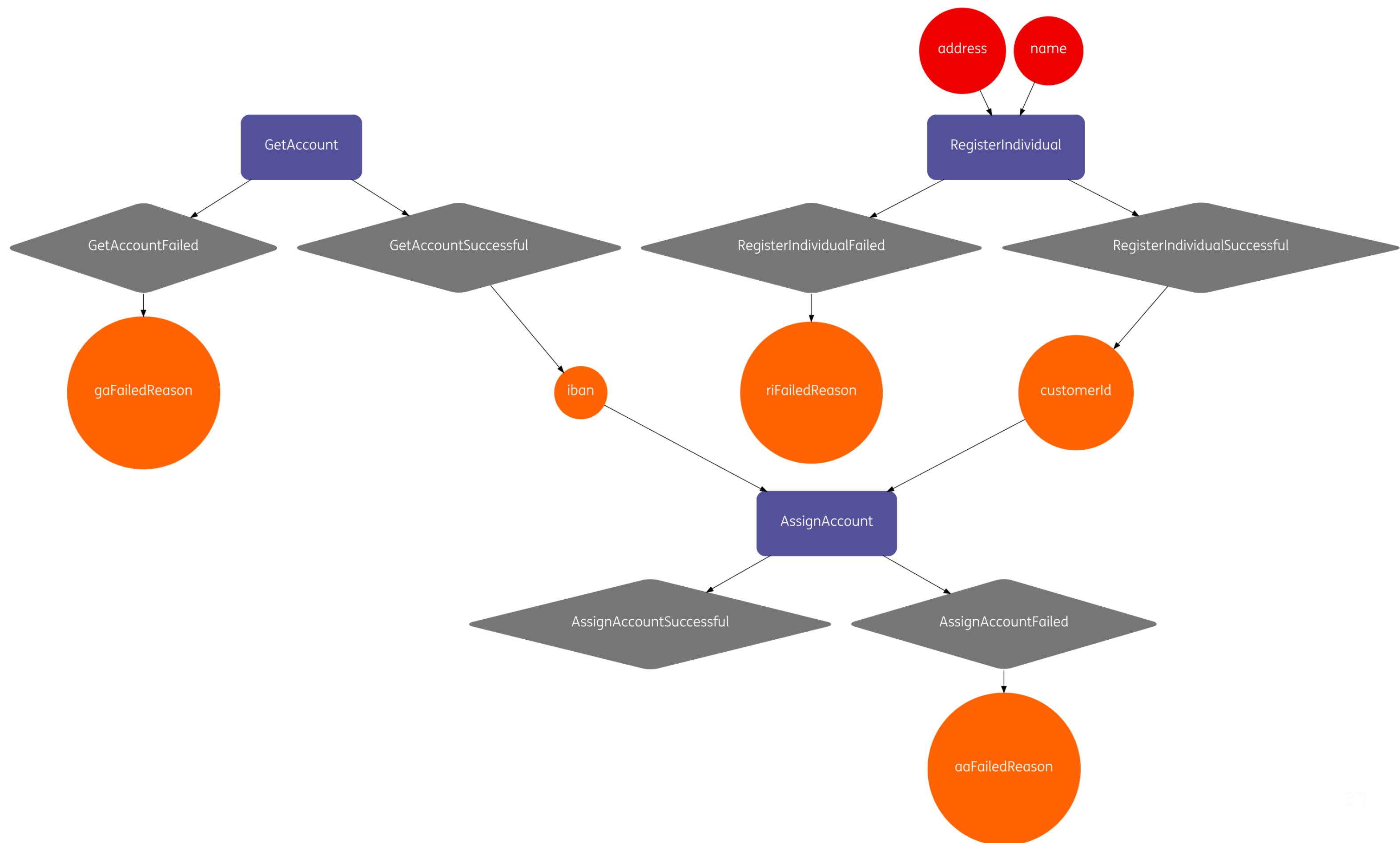
```
val registerIndividual = Interaction(  
    name = "RegisterIndividual",  
    inputIngredients = Seq(name, address),  
    output = FiresOneOfEvents(registerIndividualSuccessful, registerIndividualFailed)  
)
```



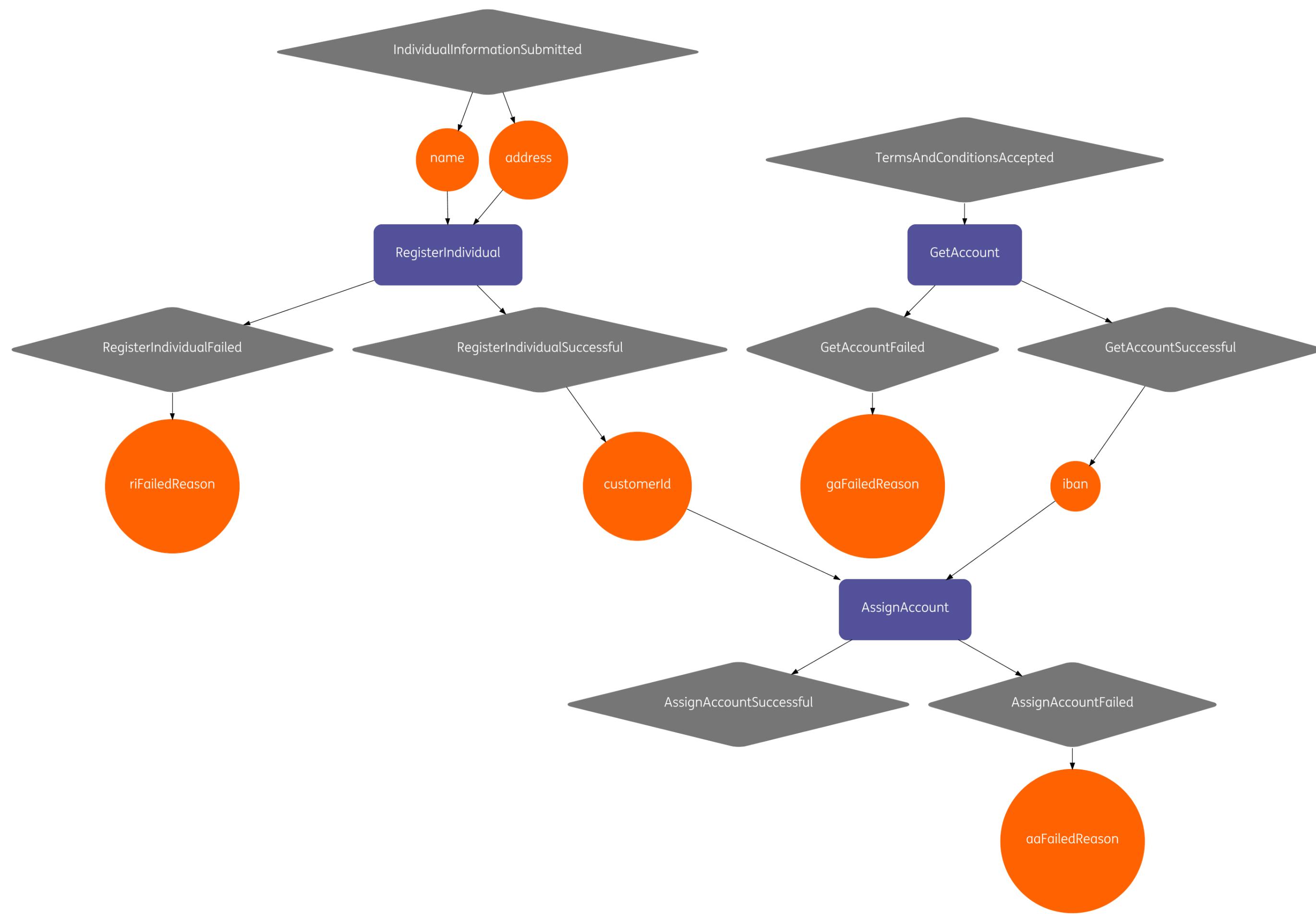




```
val recipe = Recipe("OpenAccountRecipe")
  .withInteractions(
    assignAccount,
    getAccount,
    registerIndividual)
```



```
val recipe = Recipe("OpenAccountRecipe")
    .withInteractions(
        assignAccount,
        getAccount.withRequiredEvent(termsAndConditionsAccepted),
        registerIndividual)
    .withSensoryEvents(
        termsAndConditionsAccepted,
        individualInformationSubmitted)
```

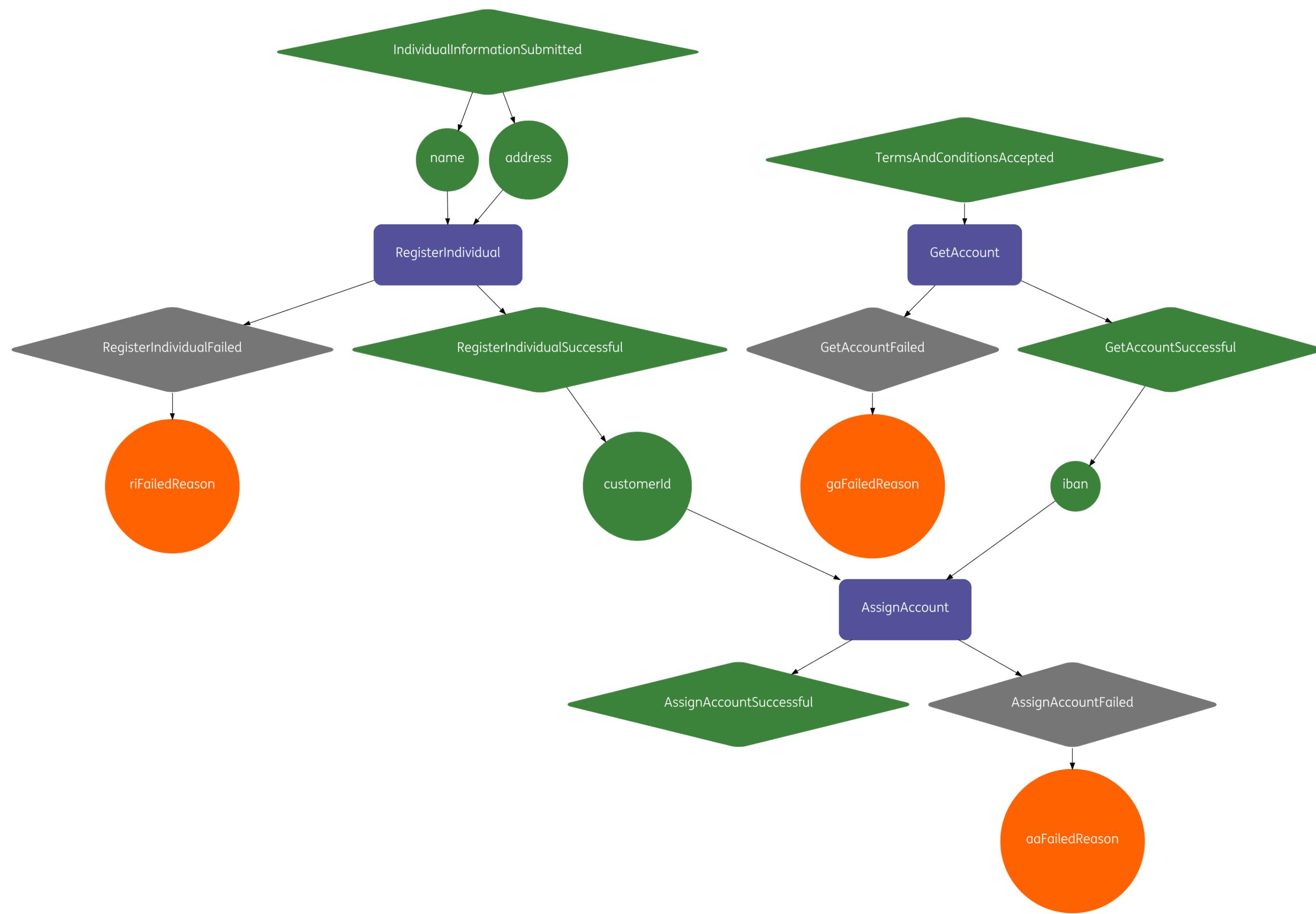


Run-time

```
//for each process instance, bake the recipe
baker.bake(processId);
//notify Baker when events occur
baker.processEvent(processId, individualInformationSubmitted.instance(name, address));
baker.processEvent(processId, termsAndConditionsAccepted.instance());

//retrieve ingredients stored in the accumulated state
assert(baker.getIngredients(processId).get("customerId").equals(customerId));
assert(baker.getIngredients(processId).get("iban").equals(iban));

//retrieve all events that have occurred
baker.events(processId)
```



```
val groceriesDone = new Event("GroceriesDone", Seq(milk, eggs, flour, butter, creme), Some(l))
```

```
val mixFirstThree = Interaction(  
  name = "MixFirstThree",  
  inputIngredients = Seq(milk, eggs, flour),  
  output = FiresOneOfEvents(batterMixed)  
)
```

```
val mixFirstThreeImpl = mixFirstThree implement {  
  (milk: String, eggs: String, flour: String) =>  
  println(s"mixing $milk, $eggs, and $flour")  
  batterMixed.instance("batter")  
}
```

I love cooking food and for the rest of the talk I'll be using examples from there. It's very similar to our industry: long hours, hard work, and delivering experiences to our customers.

Have you been woken up at 3 o'clock in the morning on a Saturday morning after a night of partying, having to go to the war room and resolve an application incident. I've been there. When I remember the cold of the airconditioners, it still makes me shiver.

If we are building microservices or a monolith or any type of application in general we are serving business logic to our clients. So no matter what, we cannot escape the architectural discussion. If we are not careful of how we architect our applications we end up serving a bad meal to our clients.