Exploring the microbiological world with OpenWhisk and Rust

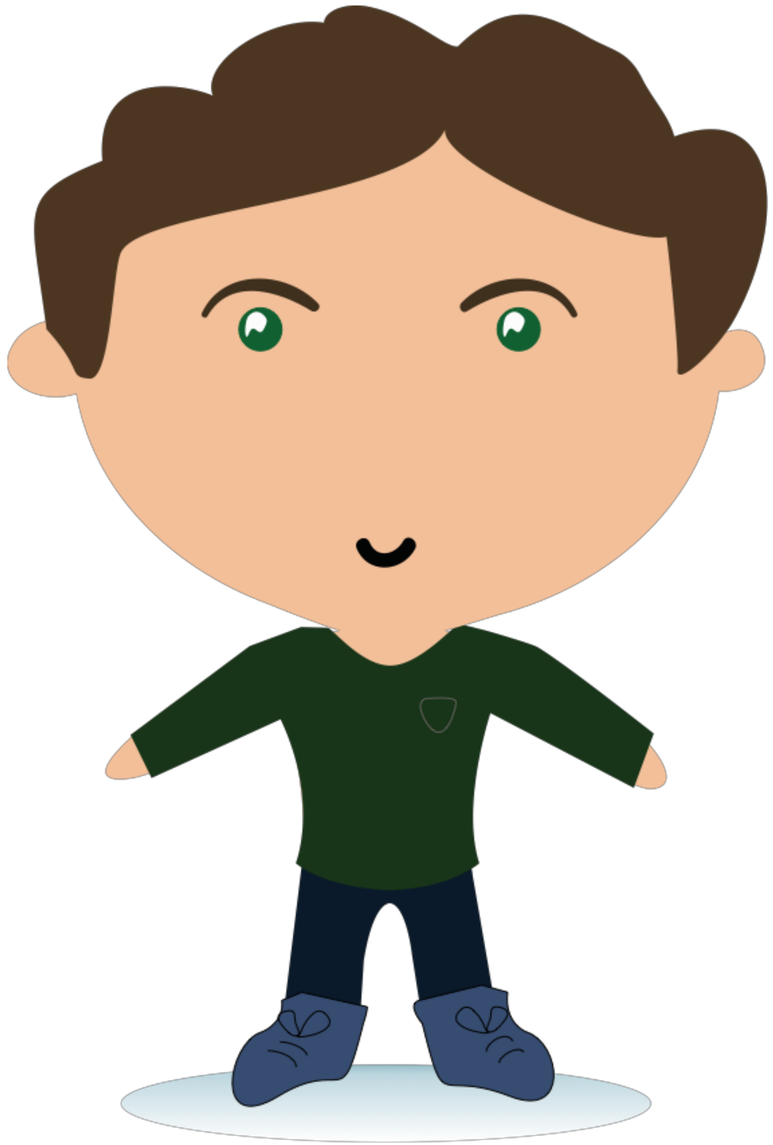
A PRESENTATION BY

the agile monkeys.

About me

- PhD in Electronics
- I love technology and IoT
- I create my own beers
- Software Developer at The Agile Monkeys

rdiaz82

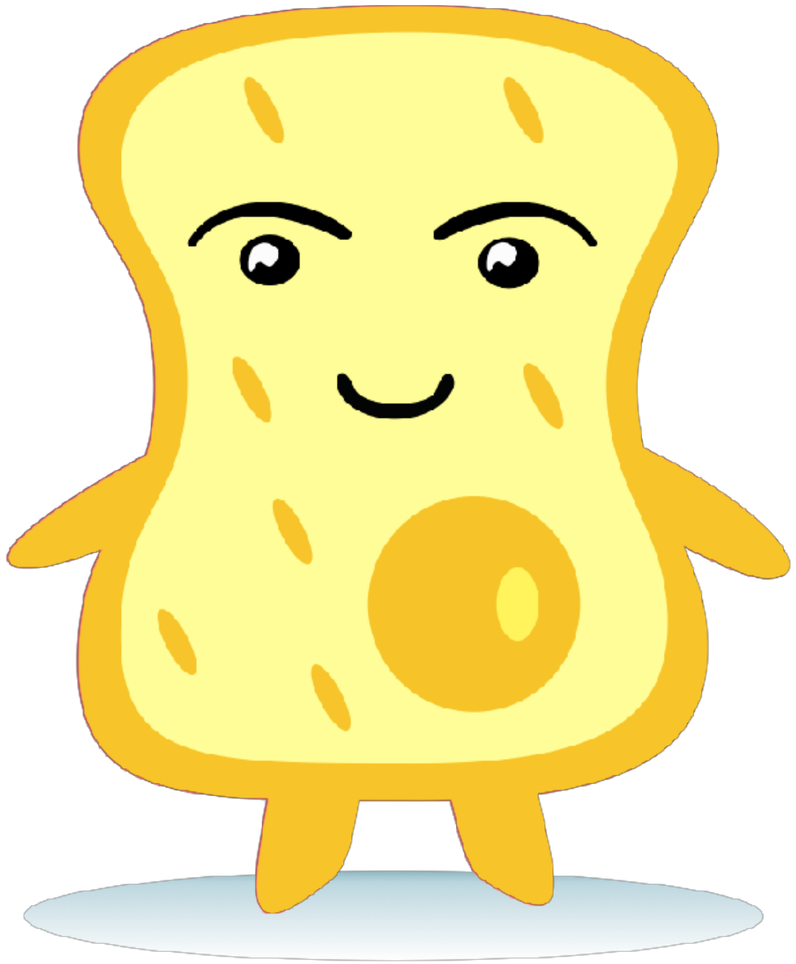


Name:
Peter AwesomeBeer

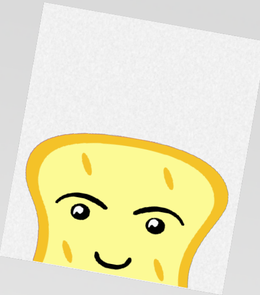
Employment:
Quality Manager

Notes:

1) Committed to quality
2) Chemistry geek
3) Improve Production Process

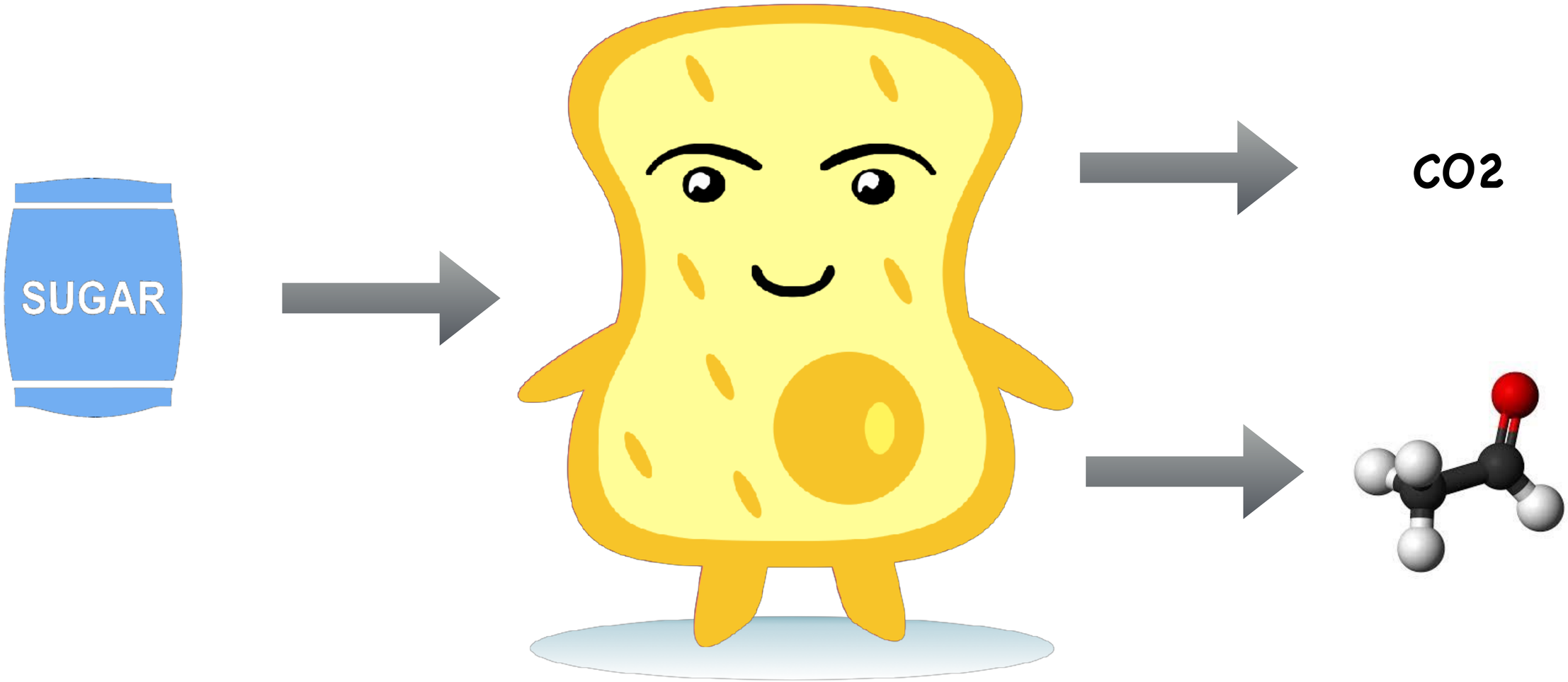


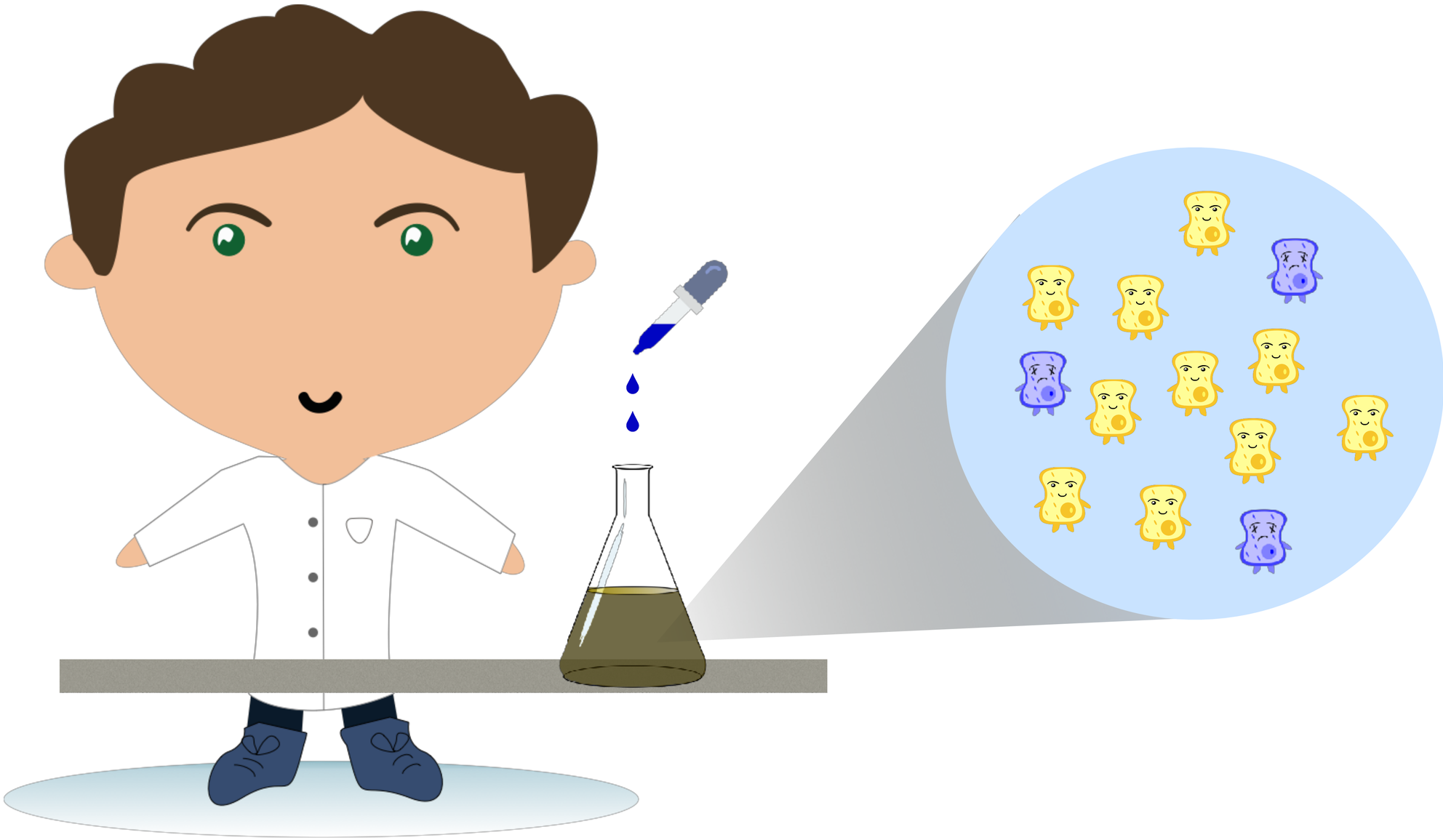
Name:
Saccharomyces cerevisiae

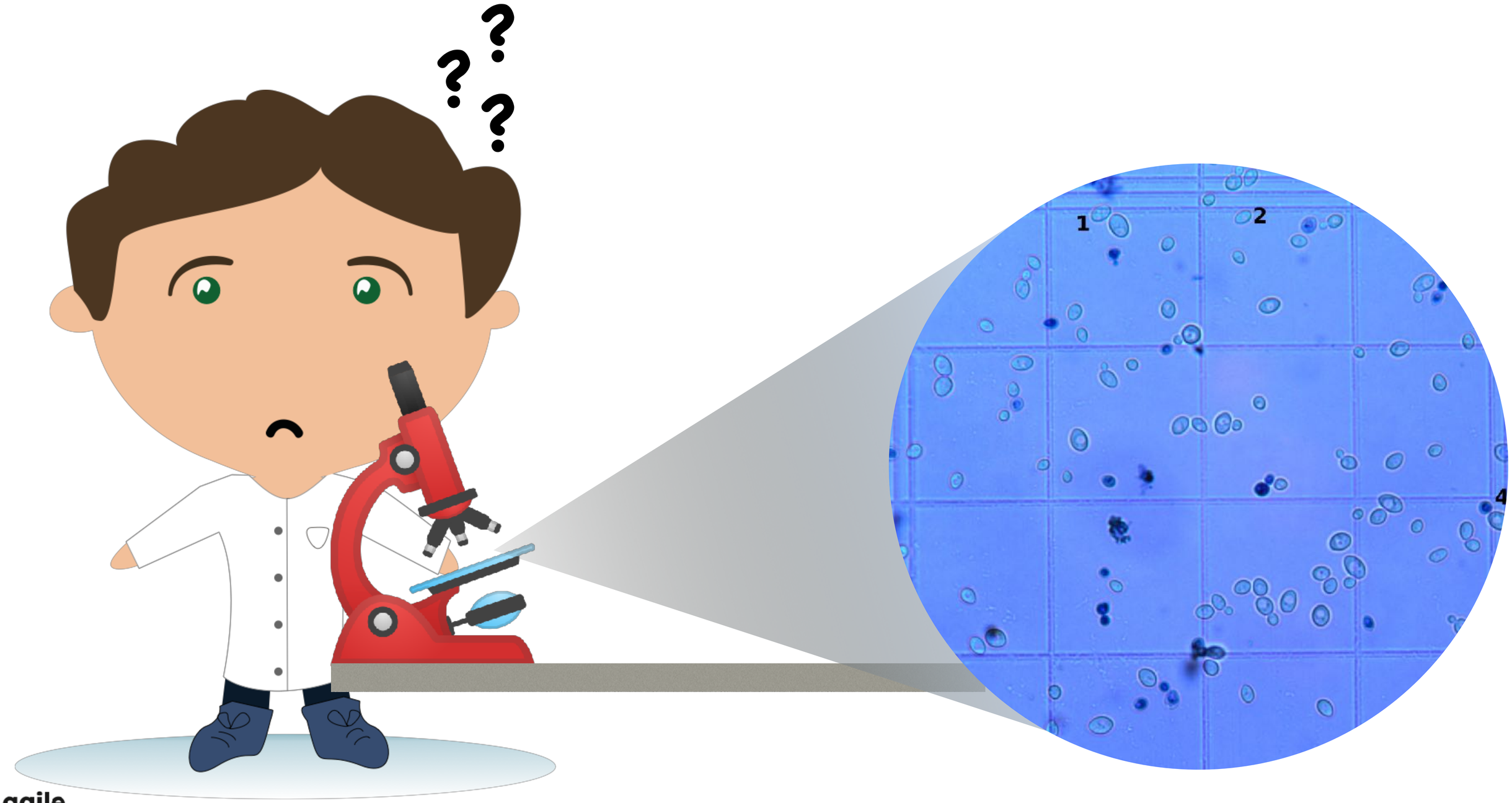


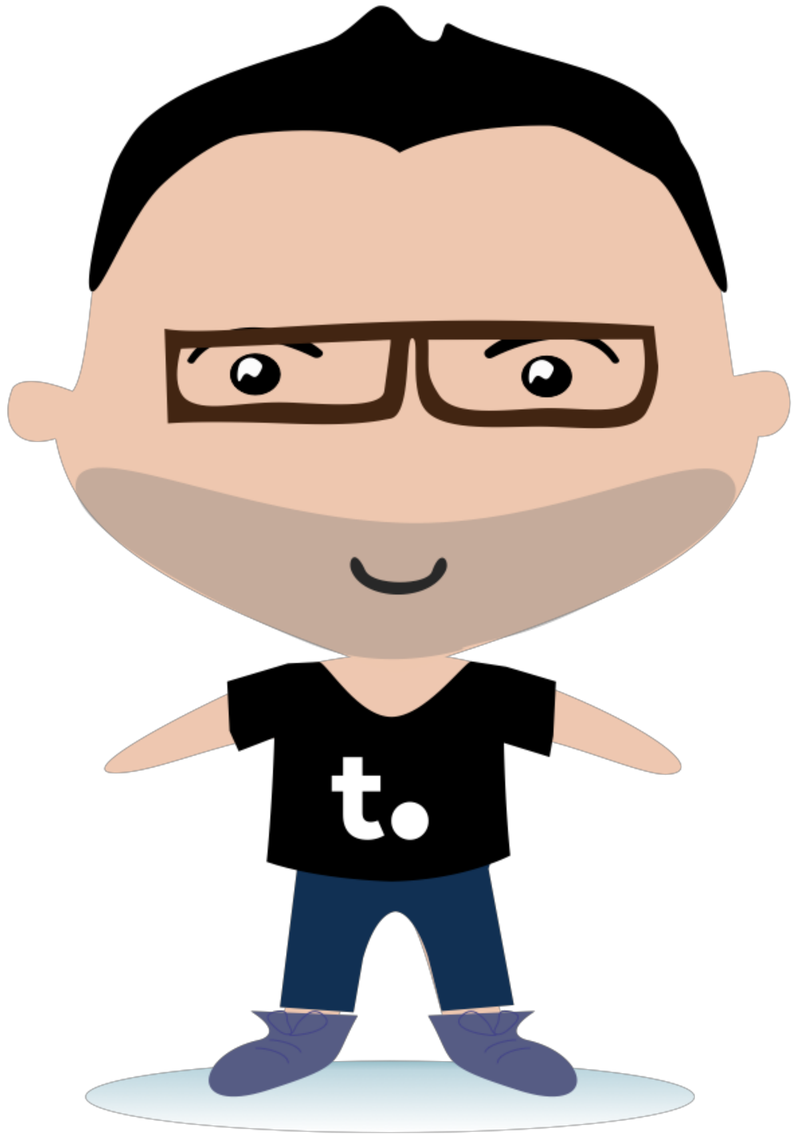
Employment:
Ferment beer

Notes:
1) Eat sugar
2) Big colonies
3) Not warm places


SUGAR
CO2



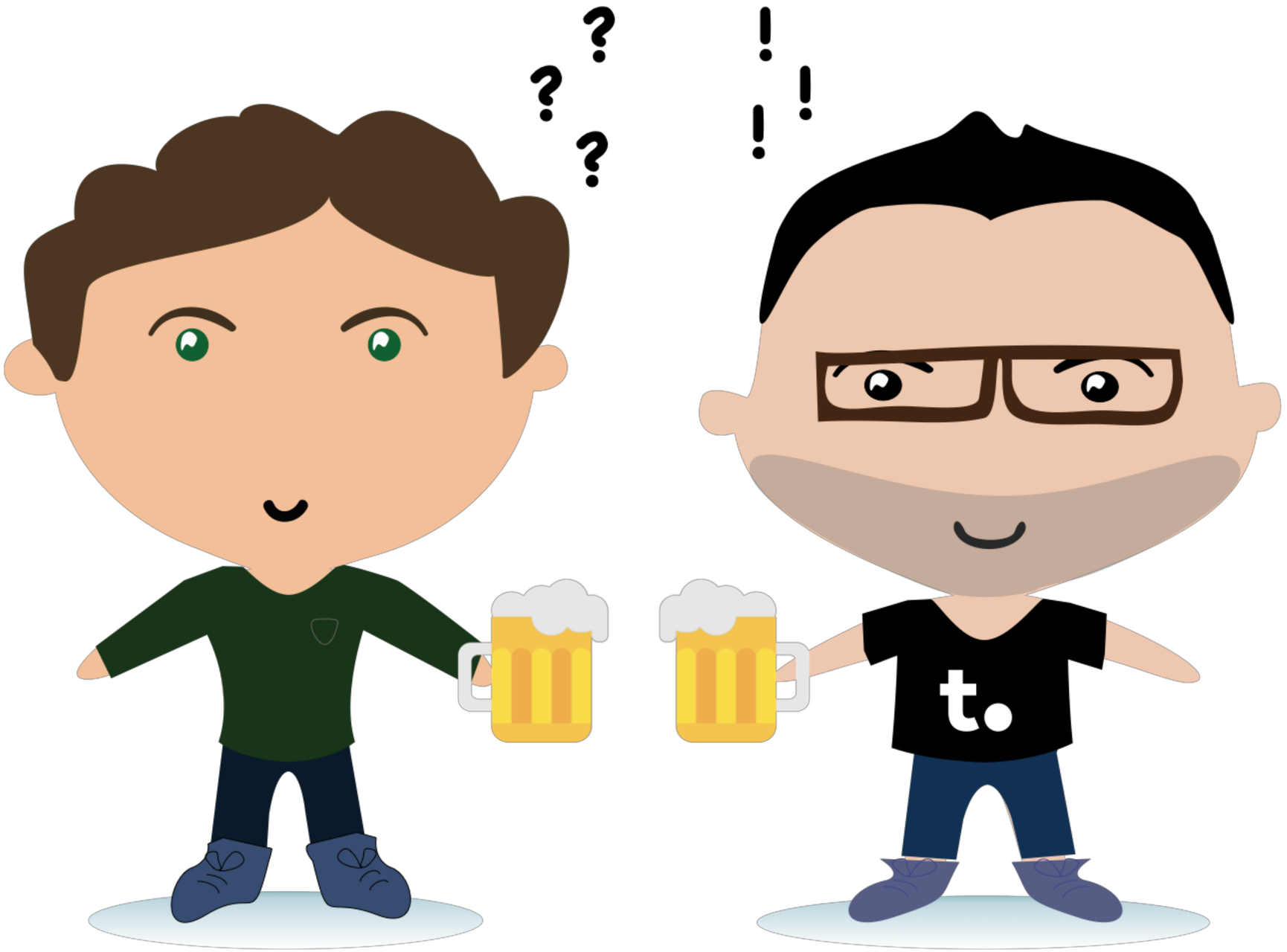




Name:
Rob SeverlessGeek

Employment:
Software Developer

Notes:
1) Serverless Technologies
2) New Challenges
3) Loves beers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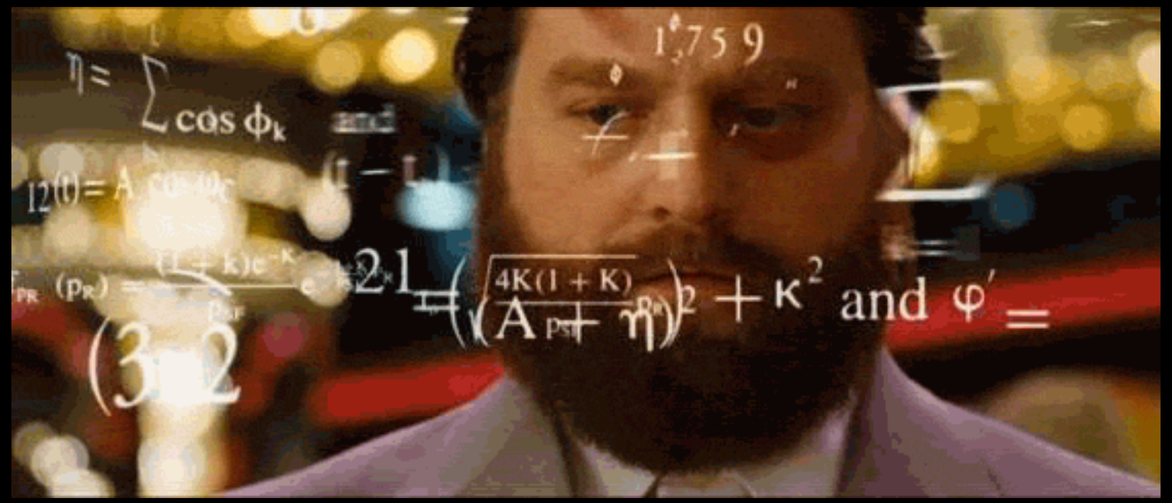
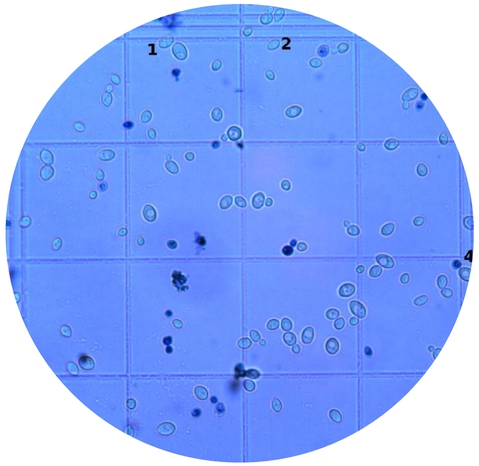
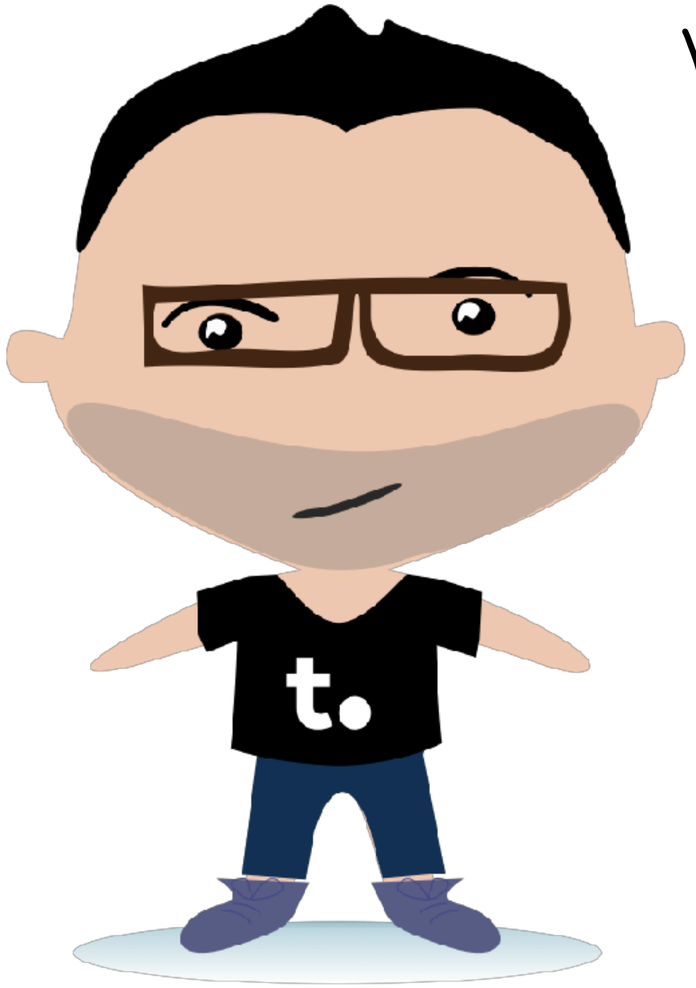


Initial system requirements

- Serverless system
- Receives an image as input
- Returns the number of cells



Number of 



Wait a Minute!!
What if...

Peter wants to add
more new features

We need a
generic solution


f(x) g(x) n(x)
Number
f(x)
g(x)
n(x)

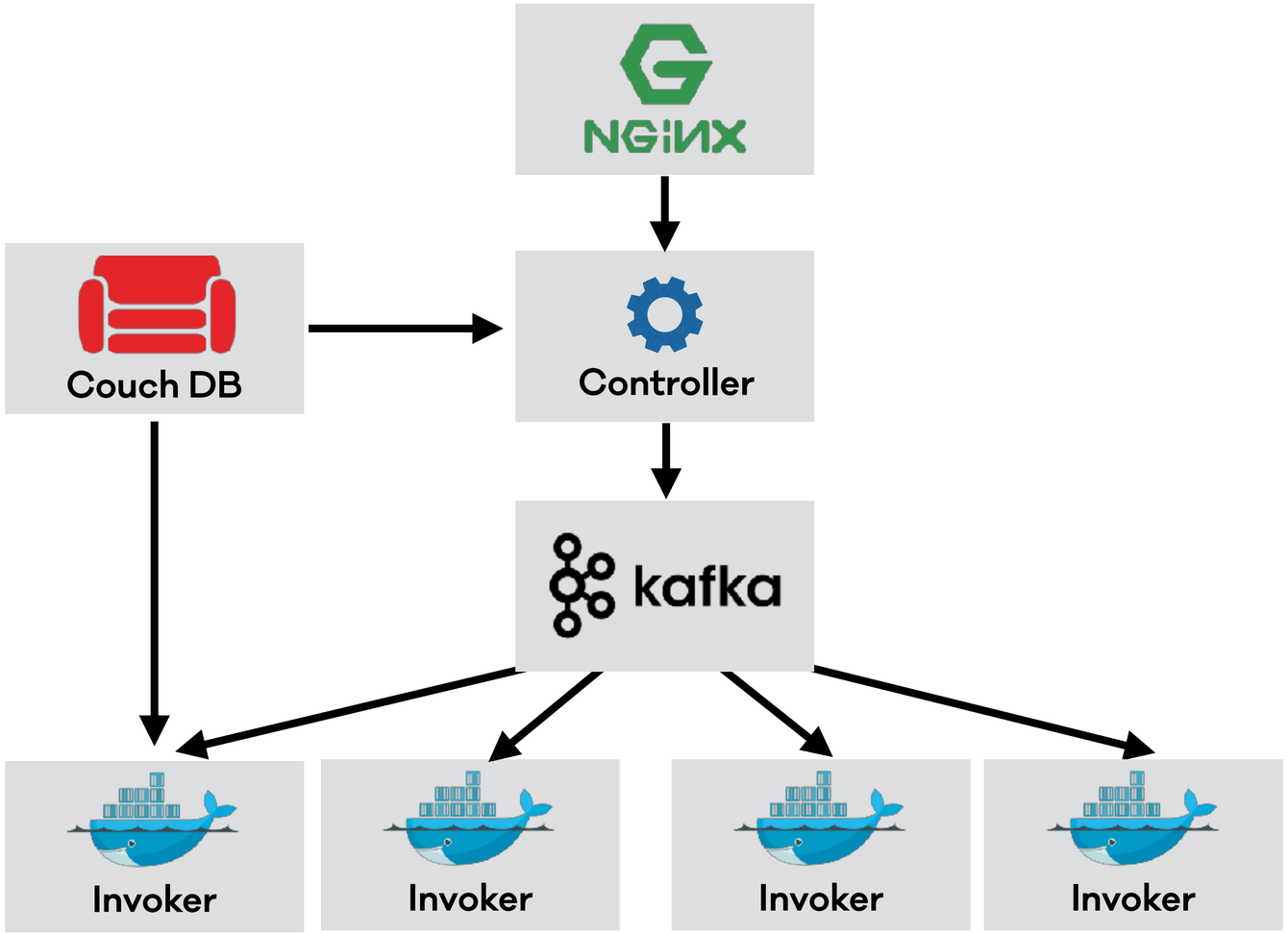
Improved system requirements

- Serverless system
- Receives an image as input
- Receives a sequence of filters
- Returns the result of the sequence

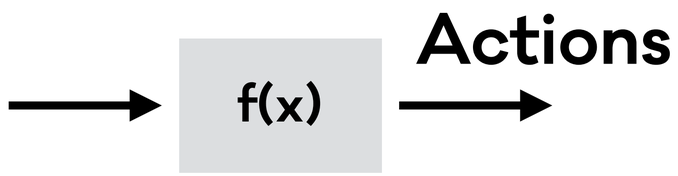
APACHE OpenWhisk™

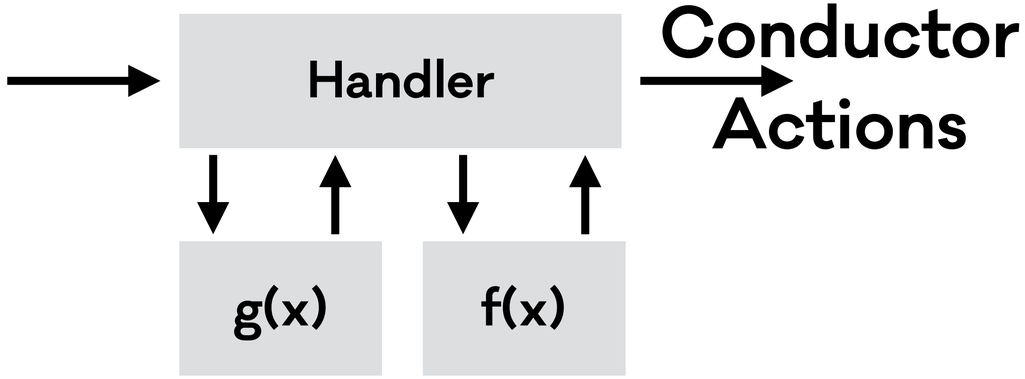
- Serverless platform developed under Apache Software Foundation.
- Adopted by IBM and Adobe
- Multi language
- Easy local development with Docker

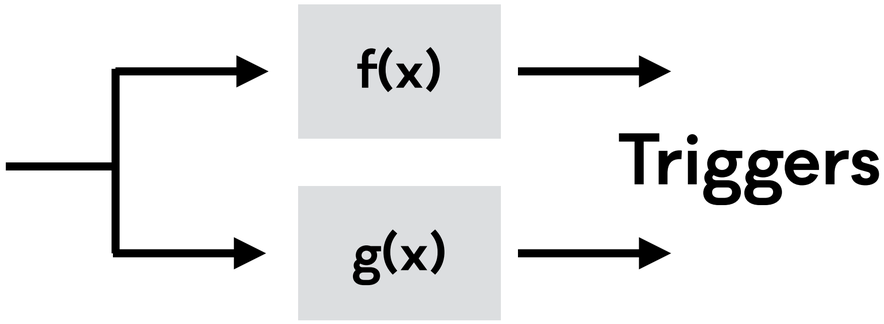
OpenWhisk Architecture

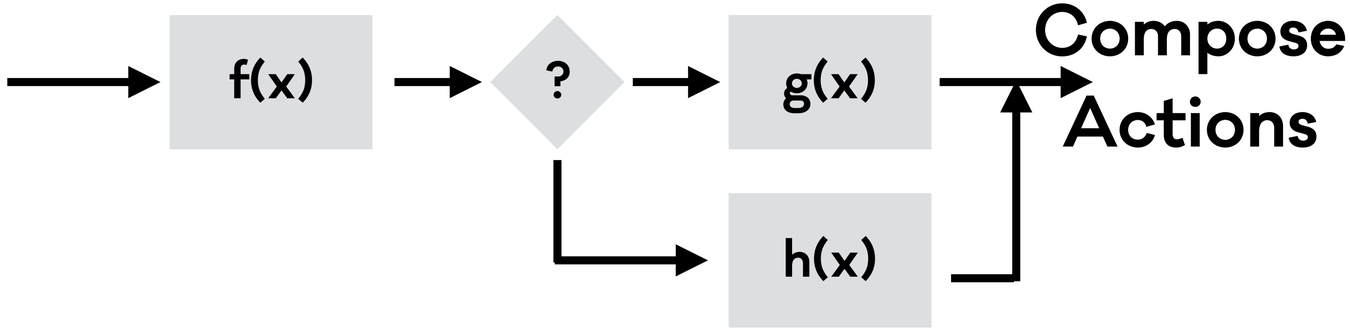


OpenWhisk Toolbox

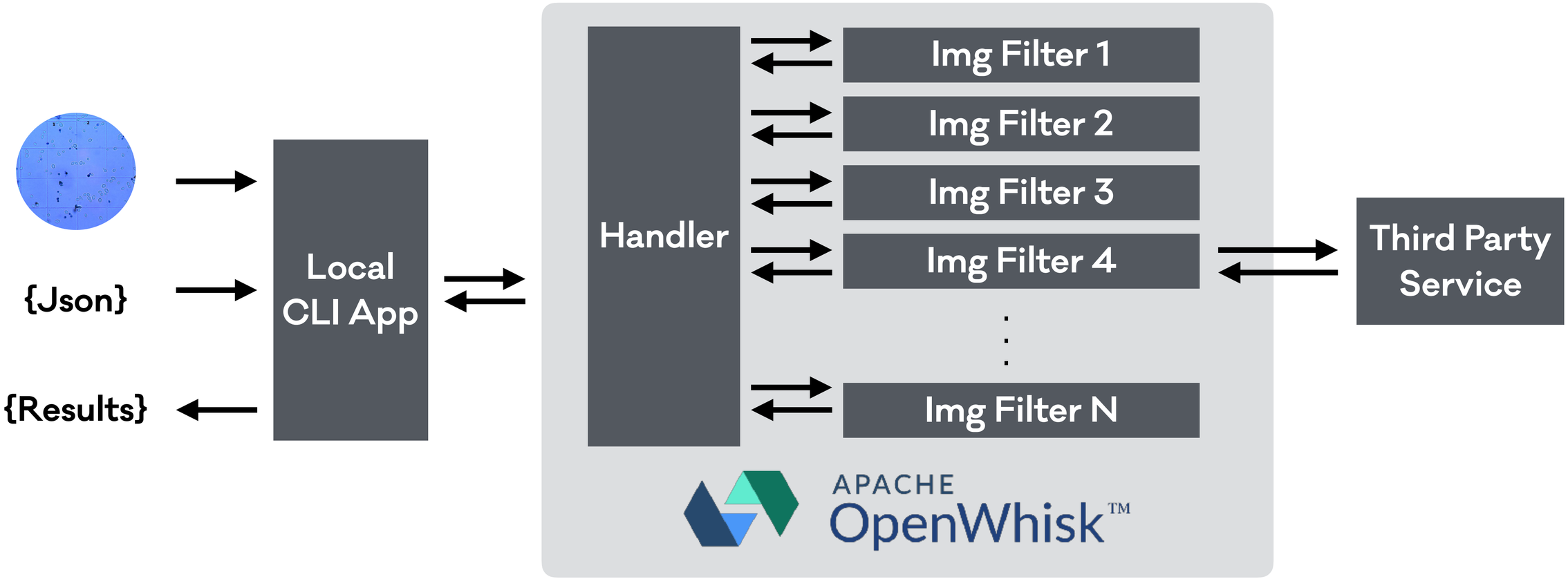




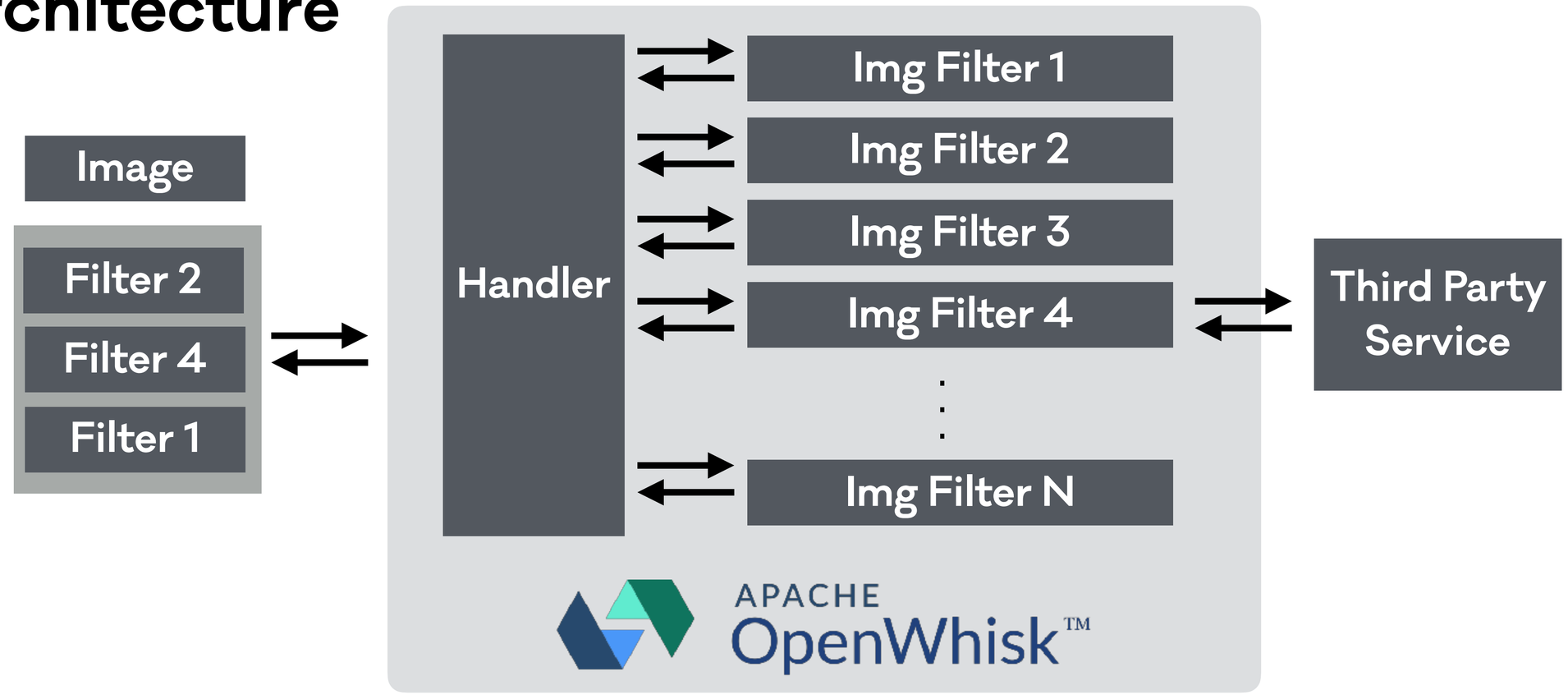




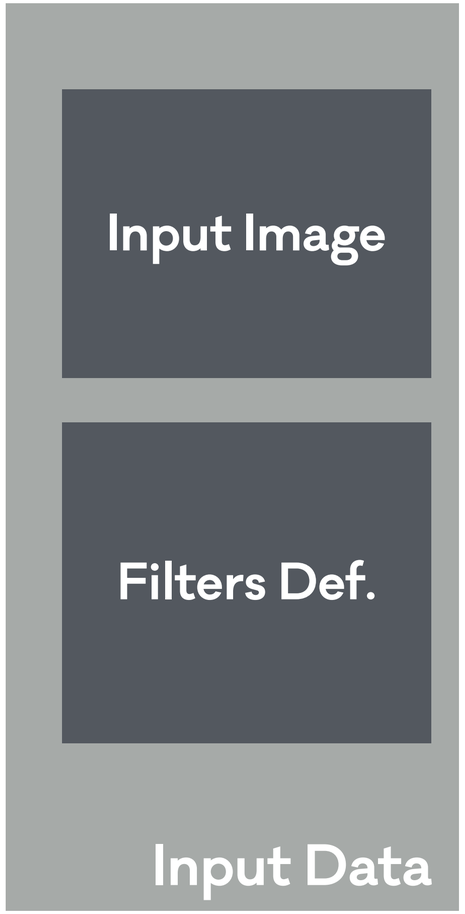
Serverless Architecture



Serverless Architecture



Data Domain definition

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    "width":"image width",
    "heigth": "image heigth"
  },
  "sequence":[
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      "filterName":"filter name",
      "params":[
        "nullable array of strings"
      ]
    }
  ]
}
```

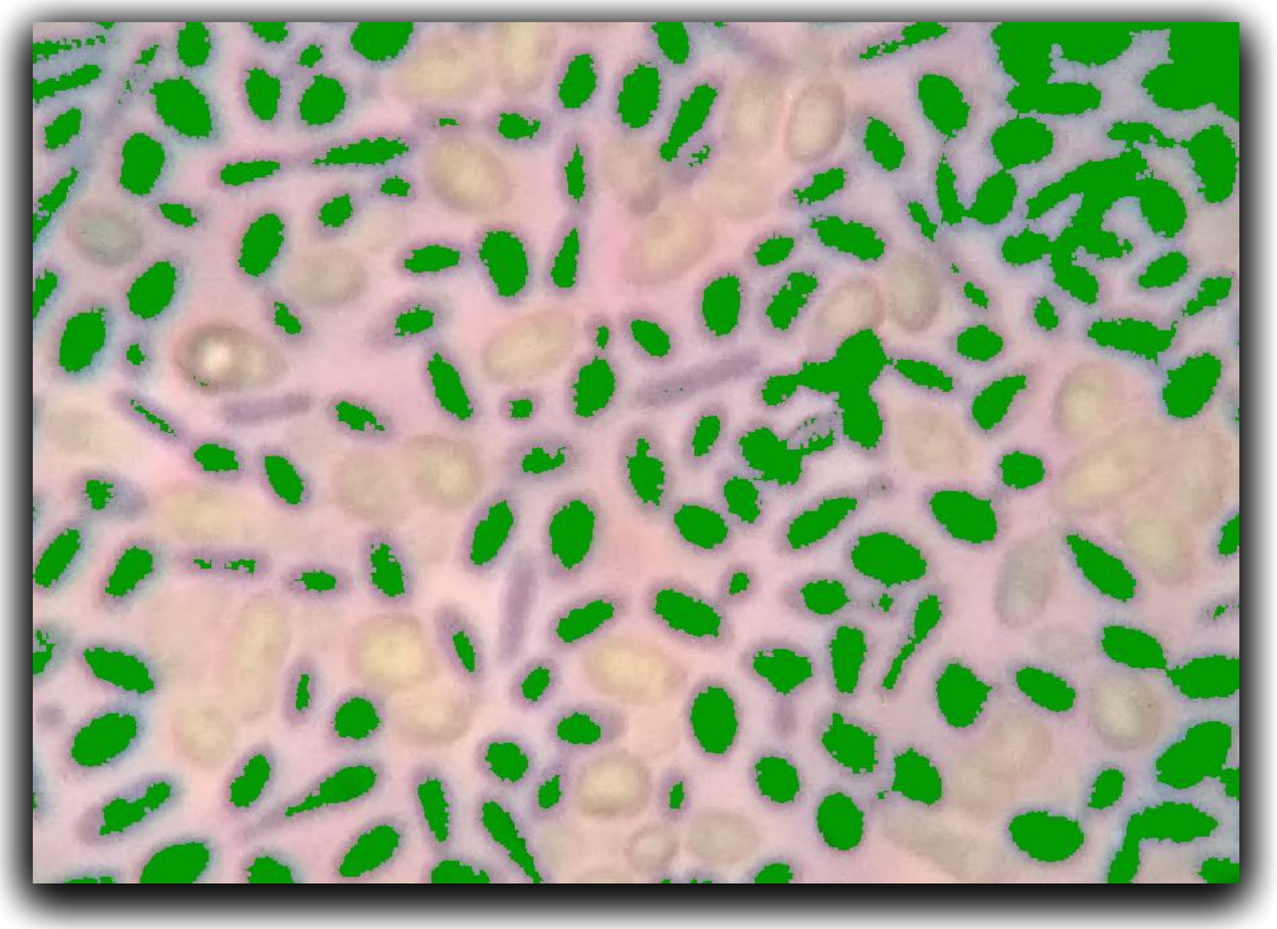
Data Domain definition


```
{"results":[
  {
    "data":"array of pixels",
    "width":"image width",
    "heigth": "image heigth"
  },
  {
    "data":"array of pixels",
    "width":"image width",
    "heigth": "image heigth"
  }
]
}
```

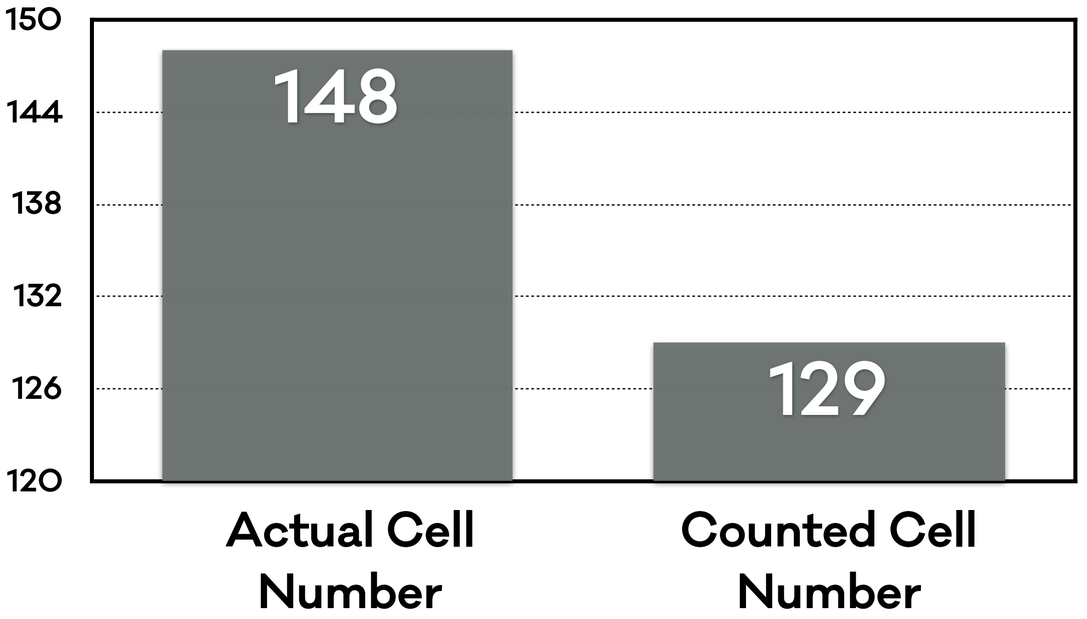
Solving Peter’s problem

- Convert image grayscale
- Adjust bright and Contrast
- Binary Image
- Dilate
- Label the image

Our Filters

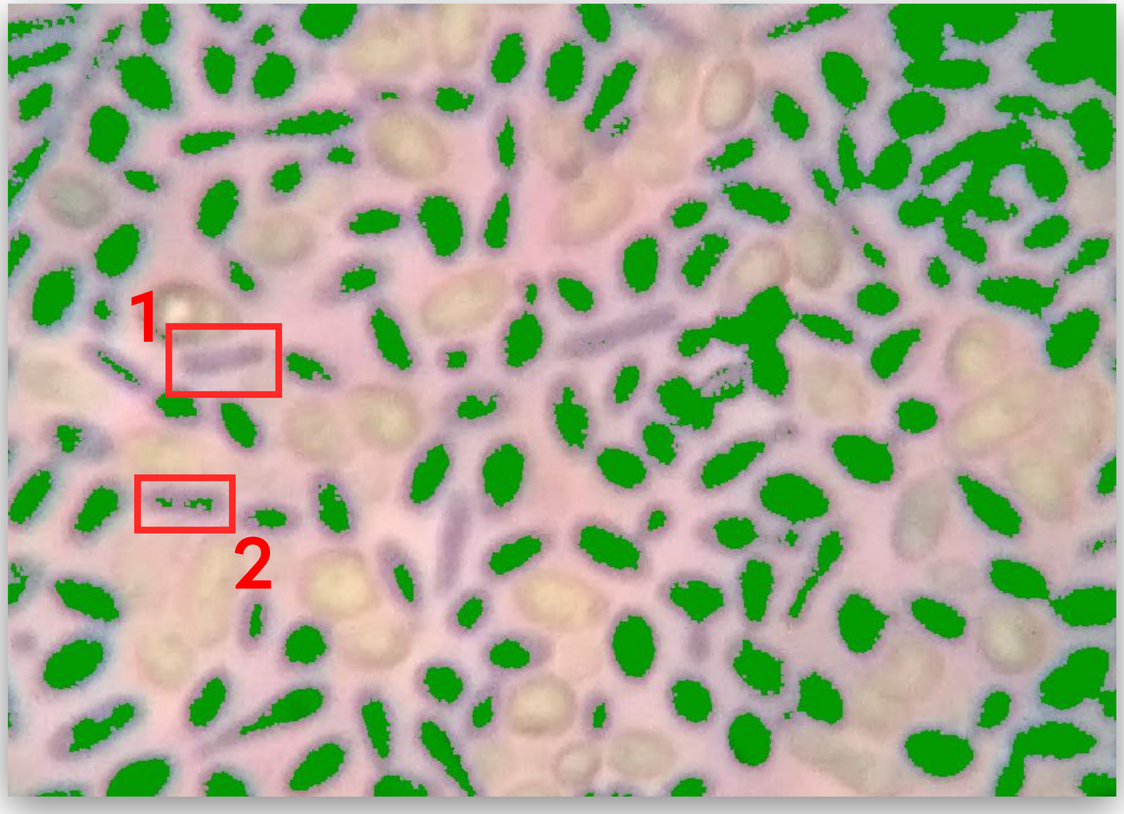


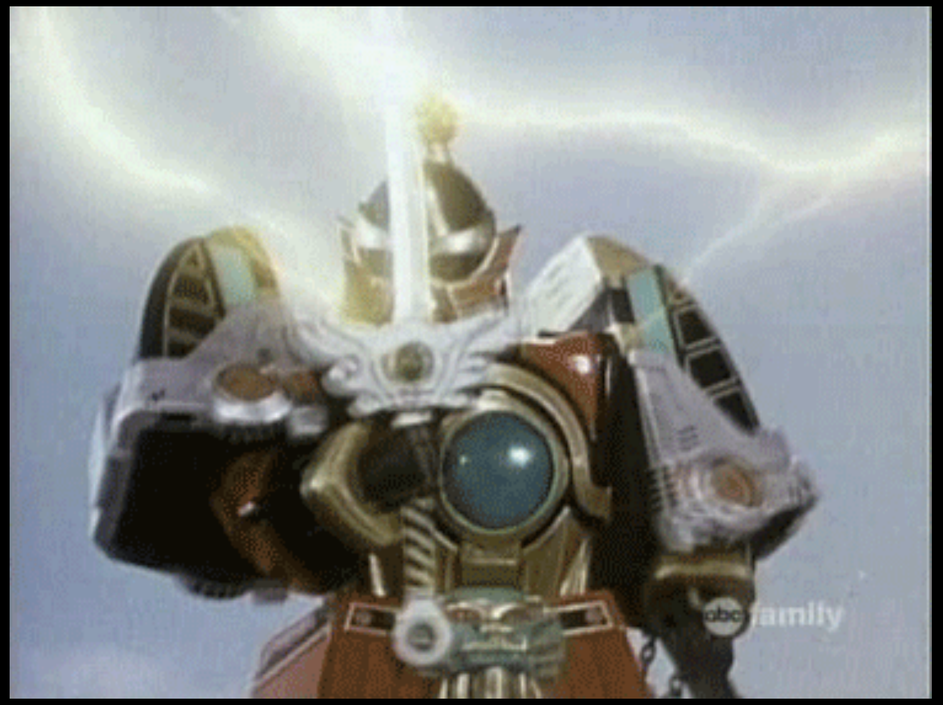
Results



Accuracy 87%

Results





Improvements and future lines

- Count living cells
- Add some AI capabilities
- Create a web interface
- Find other applications
- Create new kind of filters

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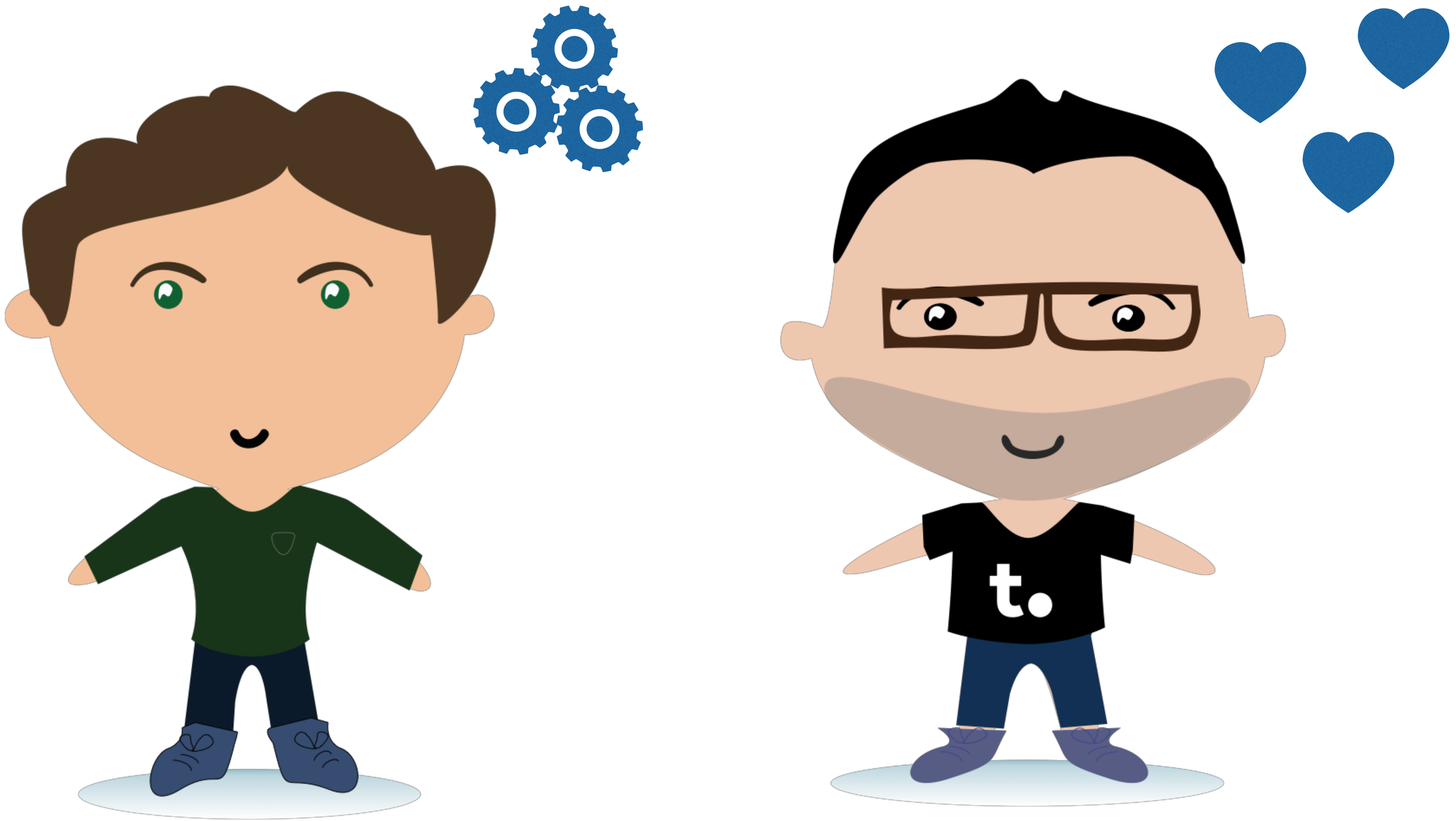
Achievements

- Serverless solving problems
- Generic reusable platform
- OpenWhisk is cool



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Thank you for your attention

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https://theagilemonkeys.com

https://medium.com/the-theam-journey

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