WELCOME

Nathan Schagen

Daniel Bradburn

crunchr

Battle Testing your API

(without going to battle ⚔)

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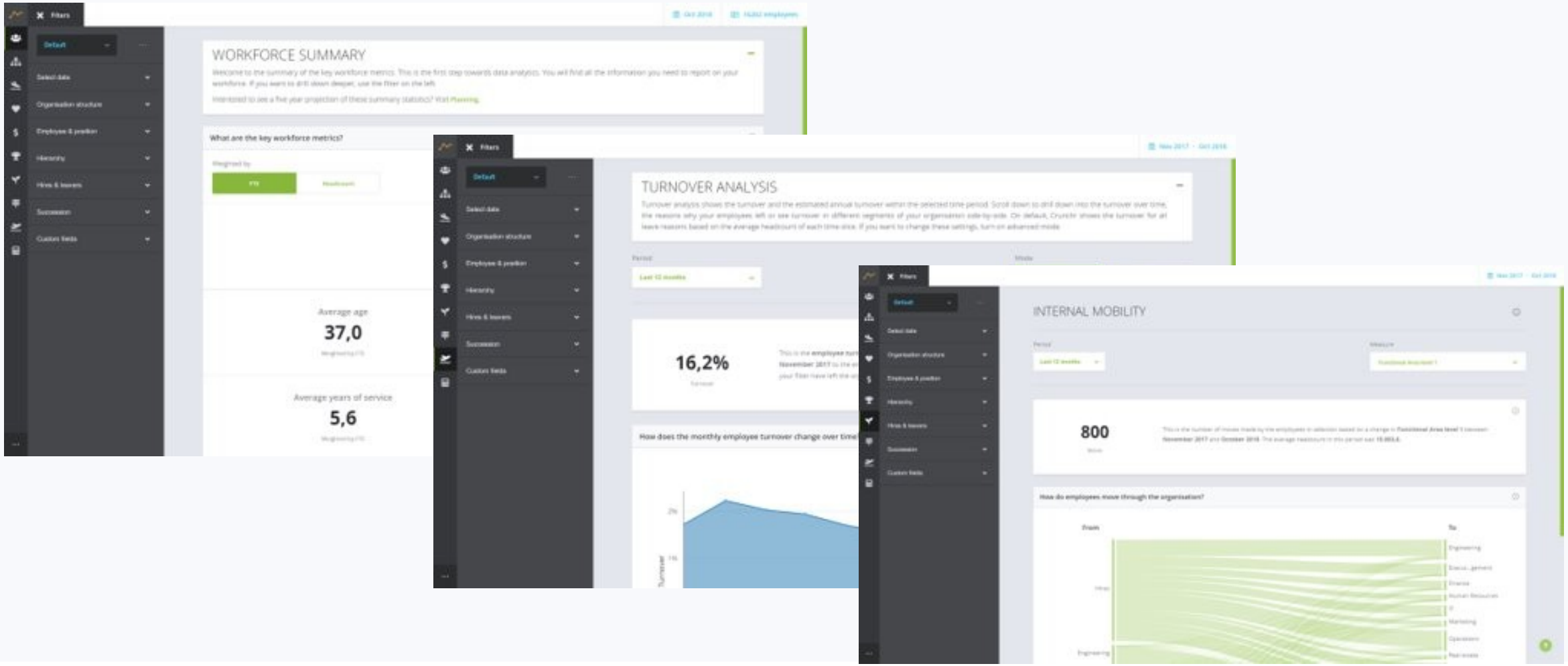
CRUNCHR



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HOW DOES CRUNCHR DO IT?

- Started with an implementation
- We are starting to specify our implementation, using OpenAPI 3.0 (a.k.a swagger)
- The goal is to reduce bugs caused by API changes:
  - Review API changes
  - Automatic testing

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```yaml
/organisation/org-chart/:
  post:
    description: >-
      Get node information for populating the org-chart.
    requestBody:
      content:
        application/json:
          schema:
            properties:
              managerIds:
                type: array
                items:
                  type: integer
                required: false
```

Example:

```
{
   "managerIds": [1, 2, 3]
}
```

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```yaml
responses:
  '200':
    description: >-
      Retrieving node information was successful.
    content:
      application/json:
        schema:
          properties:
            data:
              type: array
              items:
                properties:
                  firstName:
                    type: string
                  lastName:
                    type: string
                    ...
```

Example:

```
[
  {"firstName": "Nathan", "lastName": "Schagen", ...},
  {"firstName": "Daniel", "lastName": "Bradburn", ...}
]
```

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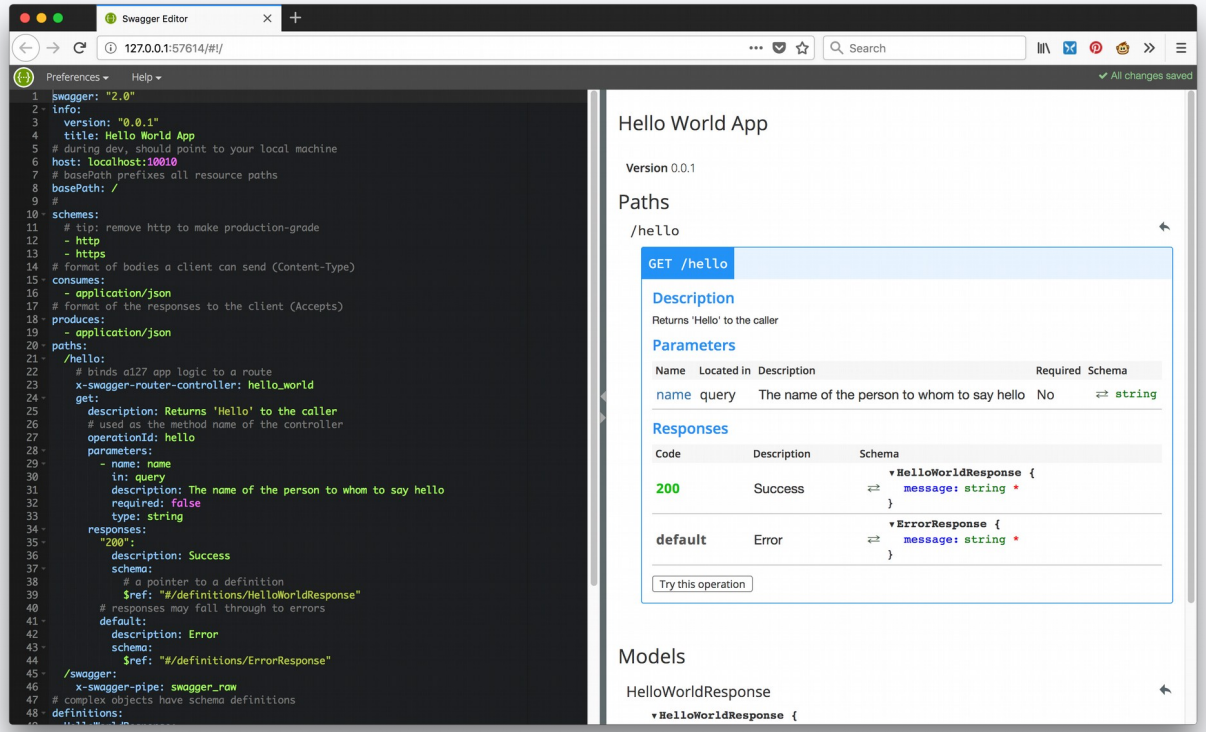
OPENAPI 3.0 POSSIBILITIES

- Describe your API-end points
  - HTTP method
  - Expected response codes
  - Parameters & Request / Response body

- Describe JSON objects using schemas
  - Types: integer, number, boolean, array, object
  - Simple constraints
  - Formats
  - Polymorphism (anyOf / allOf / oneOf)

OPENAPI TOOLING

- Swagger Editor & UI (https://editor.swagger.io/)
- Swagger CodeGen
- More commercial solutions at https://swagger.io/
- Also lots of open source projects (e.g swagger-conformance)



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RECAP

- Control over your API
- Automatic documentation
- Productivity (OpenAPI tooling)

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Property-based tests make ***statements about the output of your code*** *based on the input, and these statements are verified* ***for many different possible inputs****.*

Jessica Kerr

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```
def test_sqrt():
    assert sqrt(4) == pytest.approx(2)
```

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```
@given(st.integers(min_value=0))
def test_sqrt_x_squared_is_x(x):
    assert sqrt(x * x) == pytest.approx(x)
```

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```
@st.composite
def st_complex_objects(draw):

    st_elements = st.integers(min_value=1, max_value=10000)

    return {
        'items': draw(st.lists(st_elements)),
    }
```

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```python
@st.composite
def st_complex_objects(draw, key, is_set=False):

    st_elements = st.integers(min_value=1, max_value=10000)
    st_container = st.sets if is_set else st.lists

    return {
        key: draw(st_container(st_elements)),
    }
```

WHAT IS OPENAPI-CONFORMANCE?

- Open source library developed at **crunc**hr
- Generates a hypothesis strategy from an open api schema
- Tool for verifying an underlying implementation of an API

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```
from openapi_conformance import OpenAPIConformance

spec = 'api/org-chart.yaml'
openapi_conformance = OpenAPIConformance(spec, send_request)
```

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```
from django.test import Client

client = Client()
client.login(**user_credentials)

def send_request(operation, request):
    return getattr(client, request.method)(request.path)
```

```
/organisation/org-chart/:
  post:
    description: >-
      Get node information for populating the org-chart.
    requestBody:
      content:
        application/json:
          schema:
            properties:
              managerIds:
                type: array
                items:
                  type: integer
                  format: managerId
                required: false
              filterState: {}
```

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```
manager_ids = list(
    Position.objects.filter(is_manager=True)
                    .value_list('id', flat=True)
)

format_strategies = {
    'managerId': st.sampled_from(manager_ids),
}

openapi_conformance = OpenAPIConformance(
    spec,
    send_request,
    format_strategies=format_strategies,
)
```

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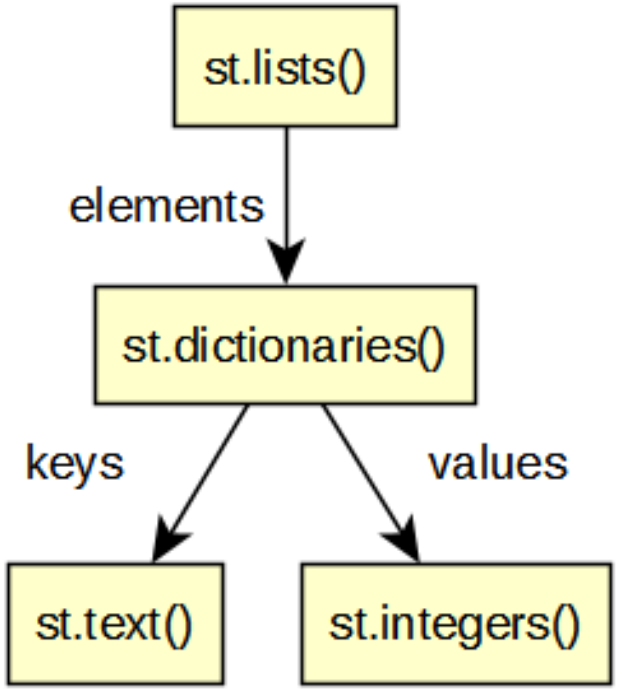

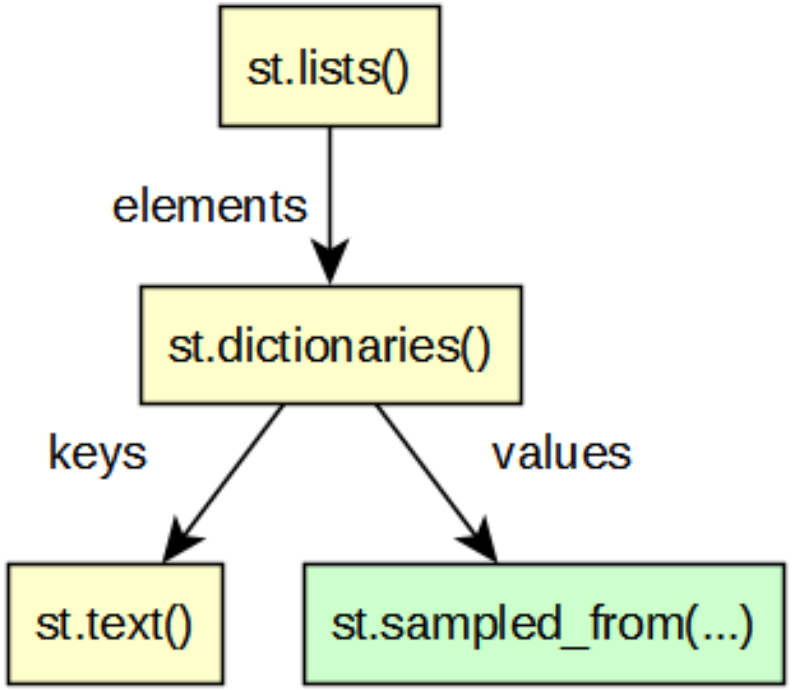

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NEXT STEPS...

- More OpenAPI support (additionalProperties, discriminator, anyOf)
- Better error messages
- Please contribute!

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RECAP

- Property based testing
- Hypothesis – parameterized composite strategies
- openapi-conformance
- Format

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THANK YOU FOR LISTENING

Please feel free to ask questions!

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