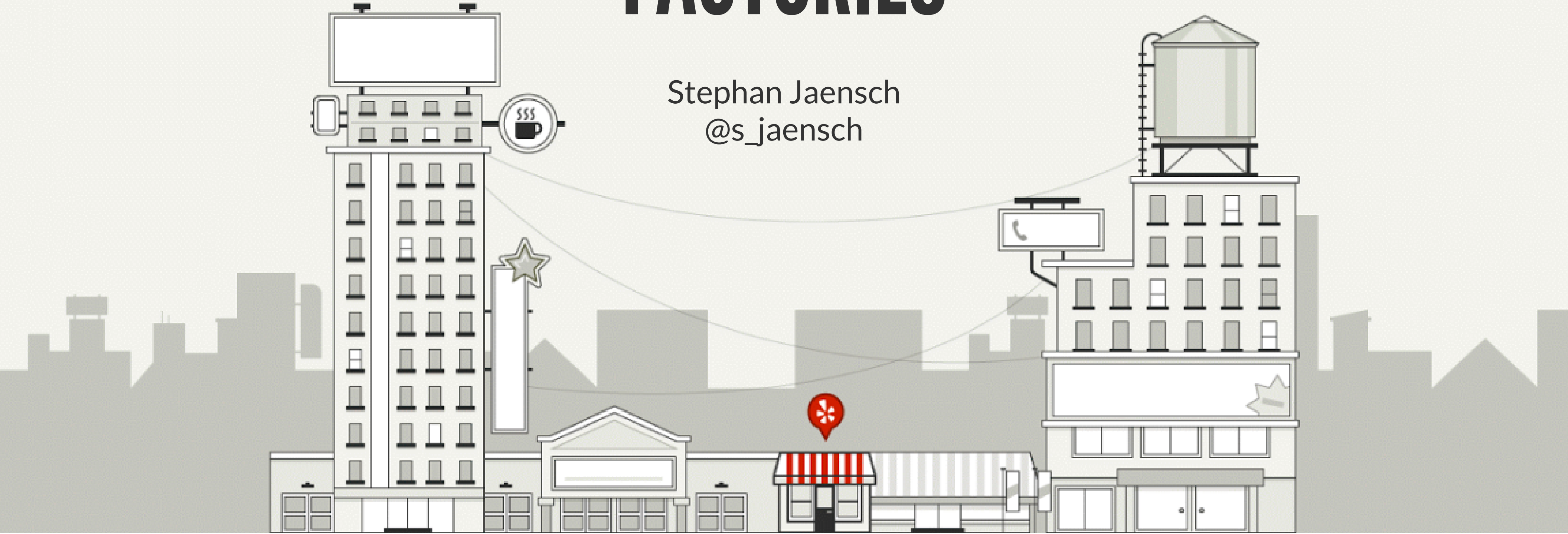
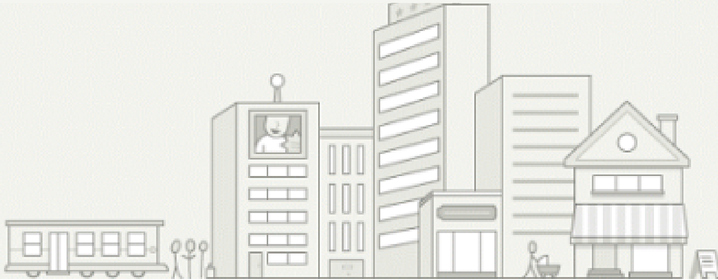
FASTER END-TO-END TESTS WITH FIXTURE FACTORIES



Stephan Jaensch
@s_jaensch

YELP'S MISSION

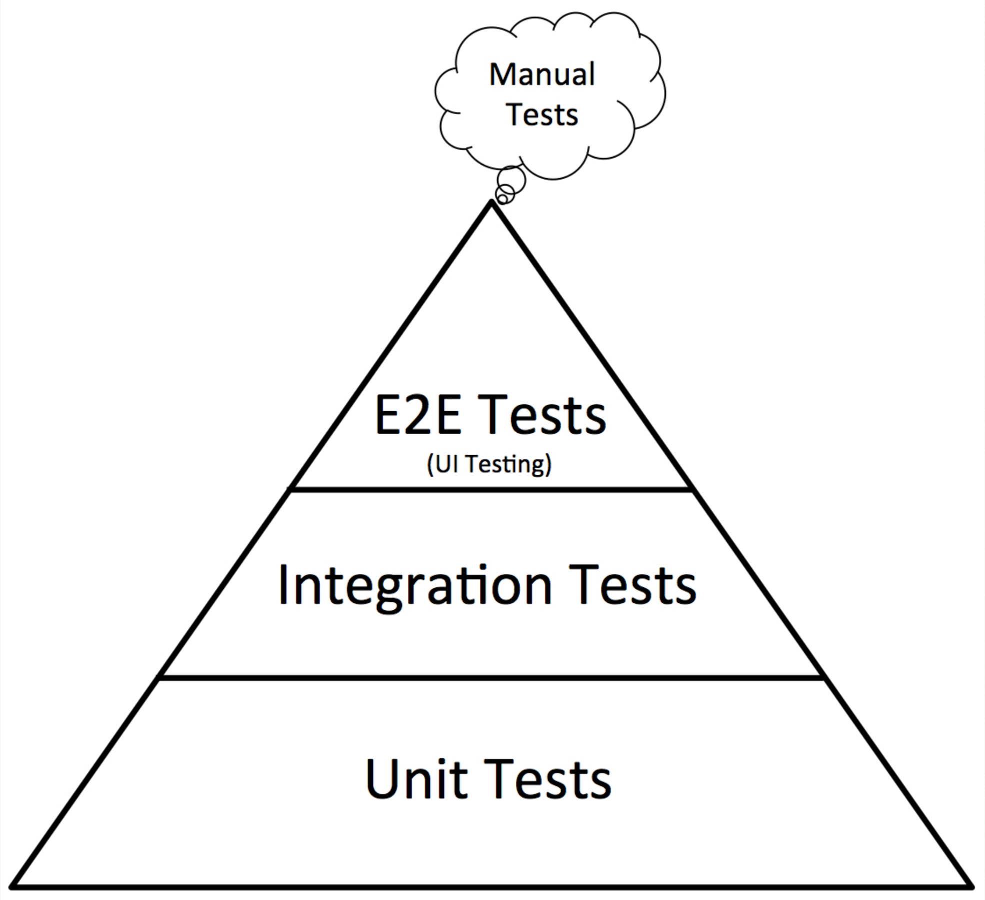
To connect people to great local businesses



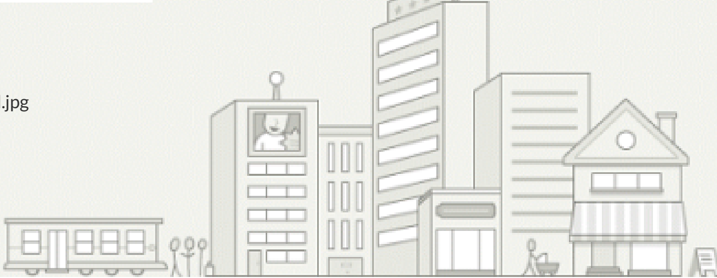
WHAT I'LL TALK ABOUT

- What are end-to-end tests?
- The problem with setting up end-to-end tests
- How do fixture (or data) factories help solve the problem?
- How can we make tests faster?

END-TO-END TESTS - THE WHAT AND WHY



Source: https://www.ministryoftesting.com/wp-content/uploads/2014/10/typical_pyramid.jpg



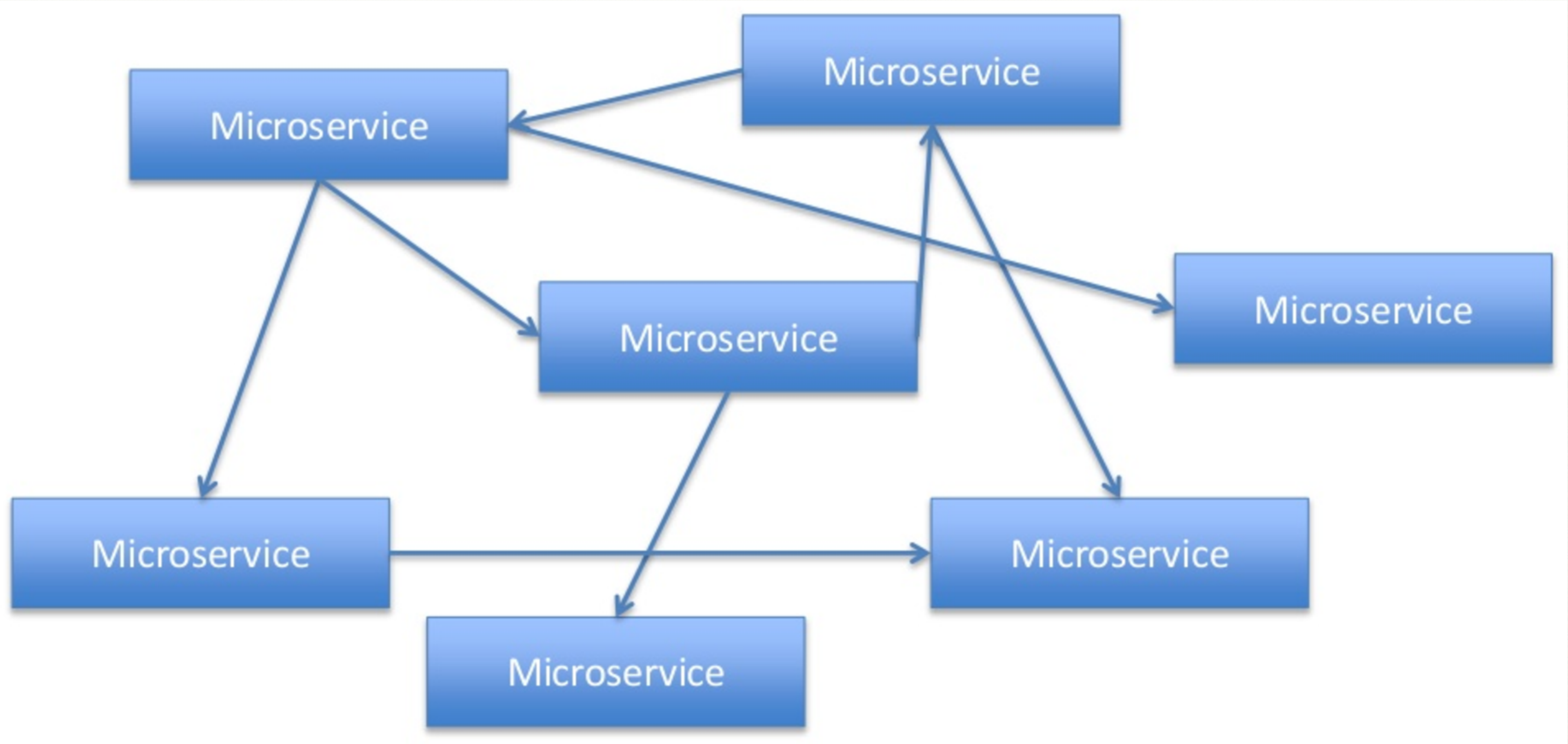
OUR SERVICE TECHNOLOGY STACK

pyramid

OPEN API INITIATIVE

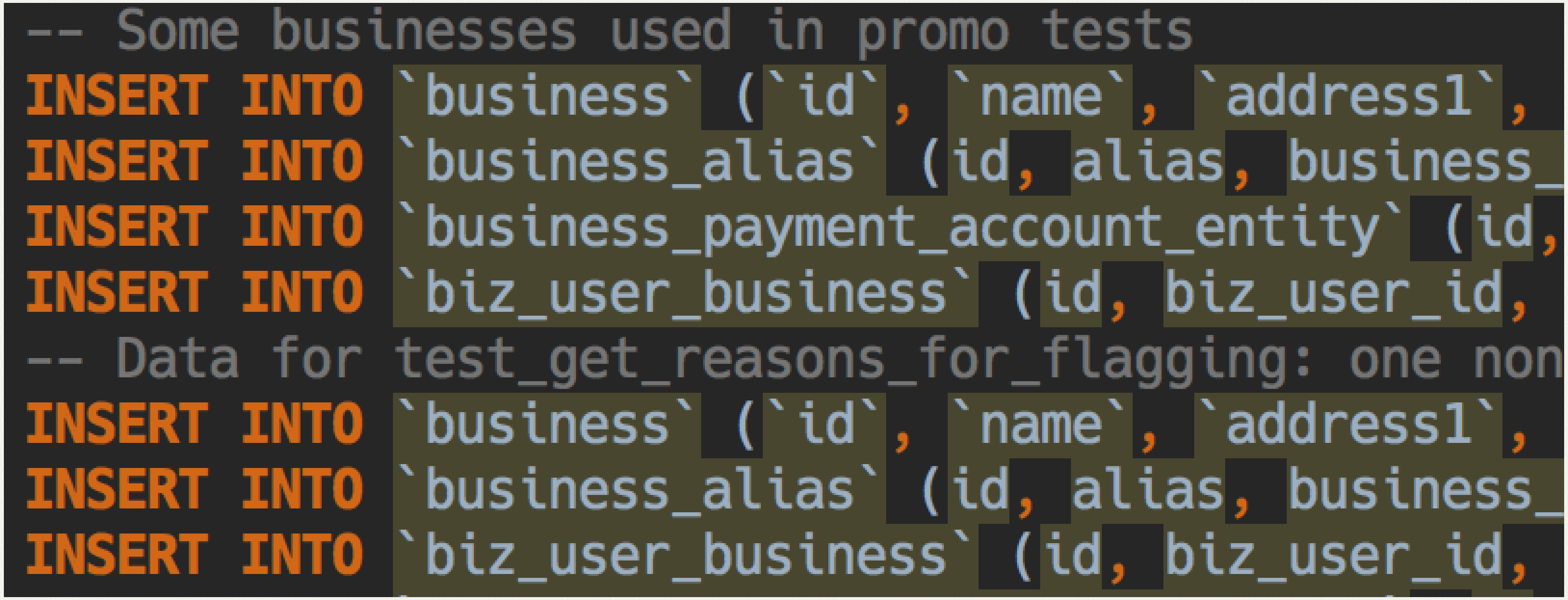
SQLAlchemy

WHAT'S HARD ABOUT E2E TESTS?



Source: https://www.slideshare.net/danveloper/microservices-the-right-way

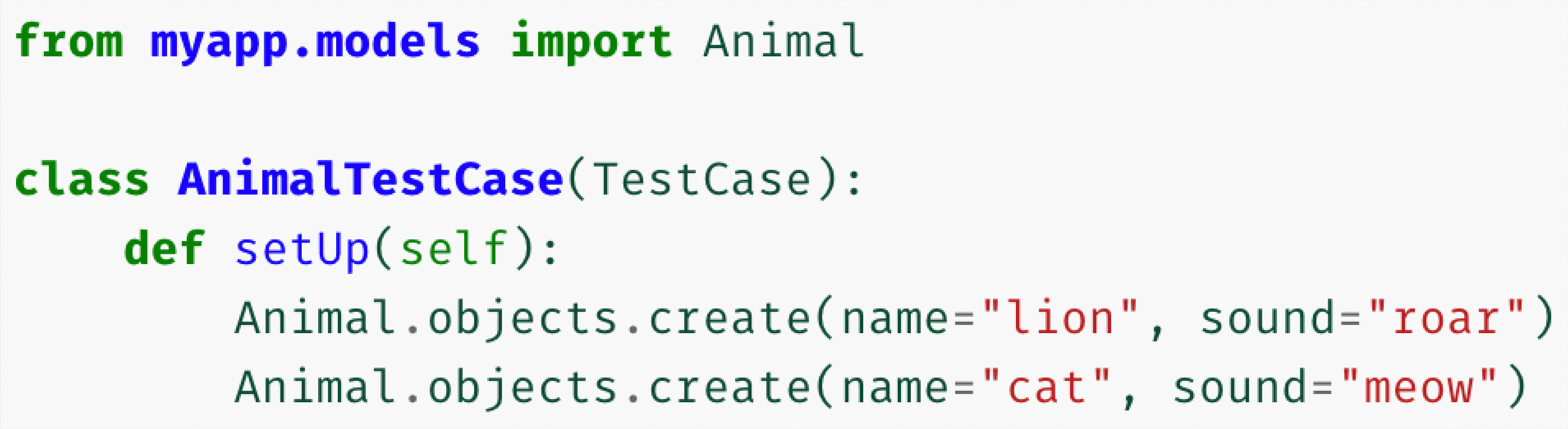
CREATING E2E TEST STATE



```
-- Some businesses used in promo tests
INSERT INTO `business` (`id`, `name`, `address1`,
INSERT INTO `business_alias` (id, alias, business_
INSERT INTO `business_payment_account_entity` (id,
INSERT INTO `biz_user_business` (id, biz_user_id,
-- Data for test_get_reasons_for_flagging: one non
INSERT INTO `business` (`id`, `name`, `address1`,
INSERT INTO `business_alias` (id, alias, business_
INSERT INTO `biz_user_business` (id, biz_user_id,
```

Lots of SQL statements...

TAKING INSPIRATION FROM DJANGO



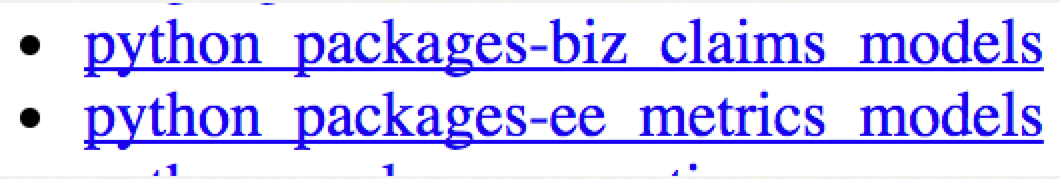
```python
from myapp.models import Animal

class AnimalTestCase(TestCase):
    def setUp(self):
        Animal.objects.create(name="lion", sound="roar")
        Animal.objects.create(name="cat", sound="meow")
```

...but for downstream services as well

...and without code duplication

TESTING FACTORY LIBRARIES



- python_packages-biz_claims_models
- python_packages-ee_metrics_models

- Contain SQLAlchemy models as well as factory functions
- Factories provide a slightly higher level of abstraction
- Take care of common default values
- Make sure data is logically correct

TEST - BEFORE

```python
def test_get_answer_list_empty_list(testapp):
    response = testapp.get(
        '/business/{business_id}/question/'
        '{question_id}/answer/v1'.format(
            business_id=encrypt_id(3),
            question_id=encrypt_id(2),
        ),
        params={
            'limit': LIMIT,
            'offset': OFFSET,
        },
    )

    assert response.json == {…}
```

TEST - AFTER

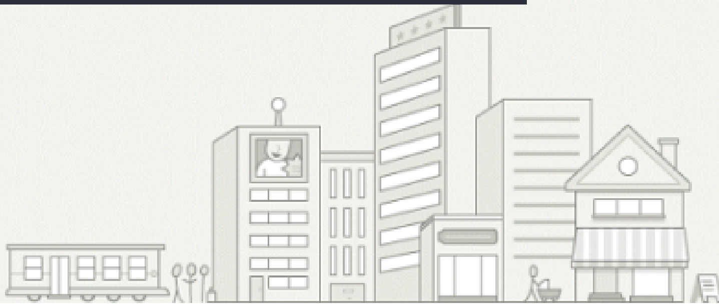
```
def test_get_answer_list_empty_list(testapp, question, business_id):
    response = testapp.get(
        '/business/{business_id}/question/'
        '{question_id}/answer/v1'.format(
            business_id=encrypt_id(business_id),
            question_id=encrypt_id(question.id),
        ),
        params={
            'limit': LIMIT,
            'offset': OFFSET,
        },
    )

    assert response.json == {…}
```

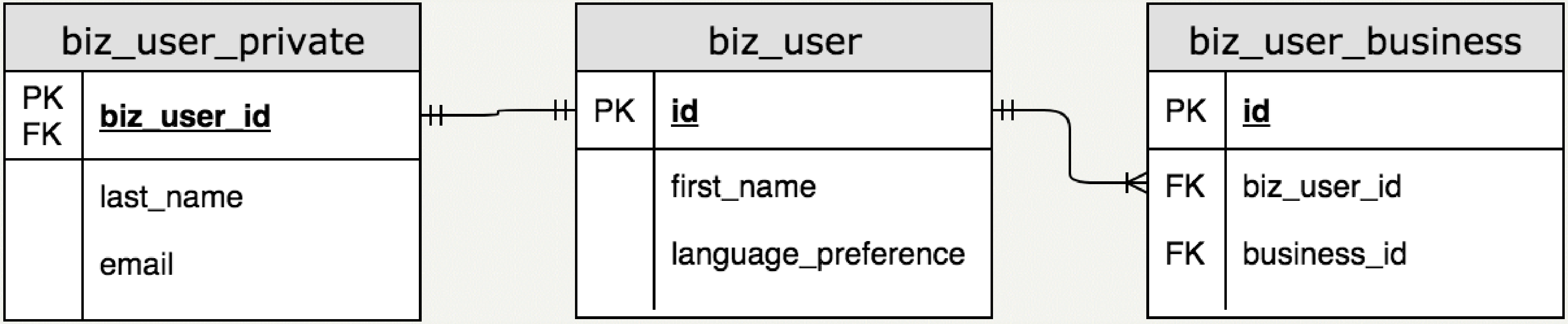
THE BUSINESS FIXTURE

```python
@pytest.fixture
def business_id(db_session):
    return business_factory.create(db_session)
```

```python
def create(
    session,
    name='Levchins',
    …
):
    business = Business(
        name=name,
        …
    )
    session.add(business)
    session.commit()
    return business.id
```



WHY NOT USE MODELS DIRECTLY?



biz_user_private	
PK FK	**biz_user_id**
	last_name email

biz_user	
PK	**id**
	first_name language_preference

biz_user_business	
PK	**id**
FK	biz_user_id
FK	business_id

WHY NOT USE MODELS DIRECTLY?

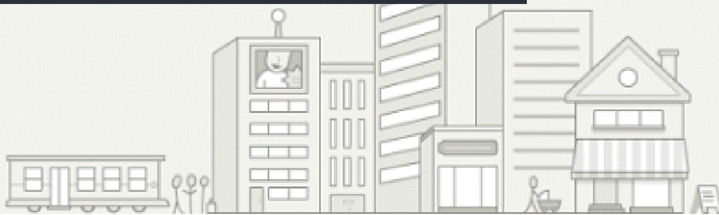
```
def biz_user_create(session, business_id=None, email=None, …):
    """Creates a biz_user with password 'password'"""
    biz_user = BizUser(
        …
    )
    session.add(biz_user)
    session.flush()

    session.add(
        BizUserPrivate(
            biz_user_id=biz_user.id,
            email=email,
        )
    )

    if business_id:
        add_biz_user_to_business(session, biz_user.id, business_id)

    session.commit()

    return biz_user.id
```



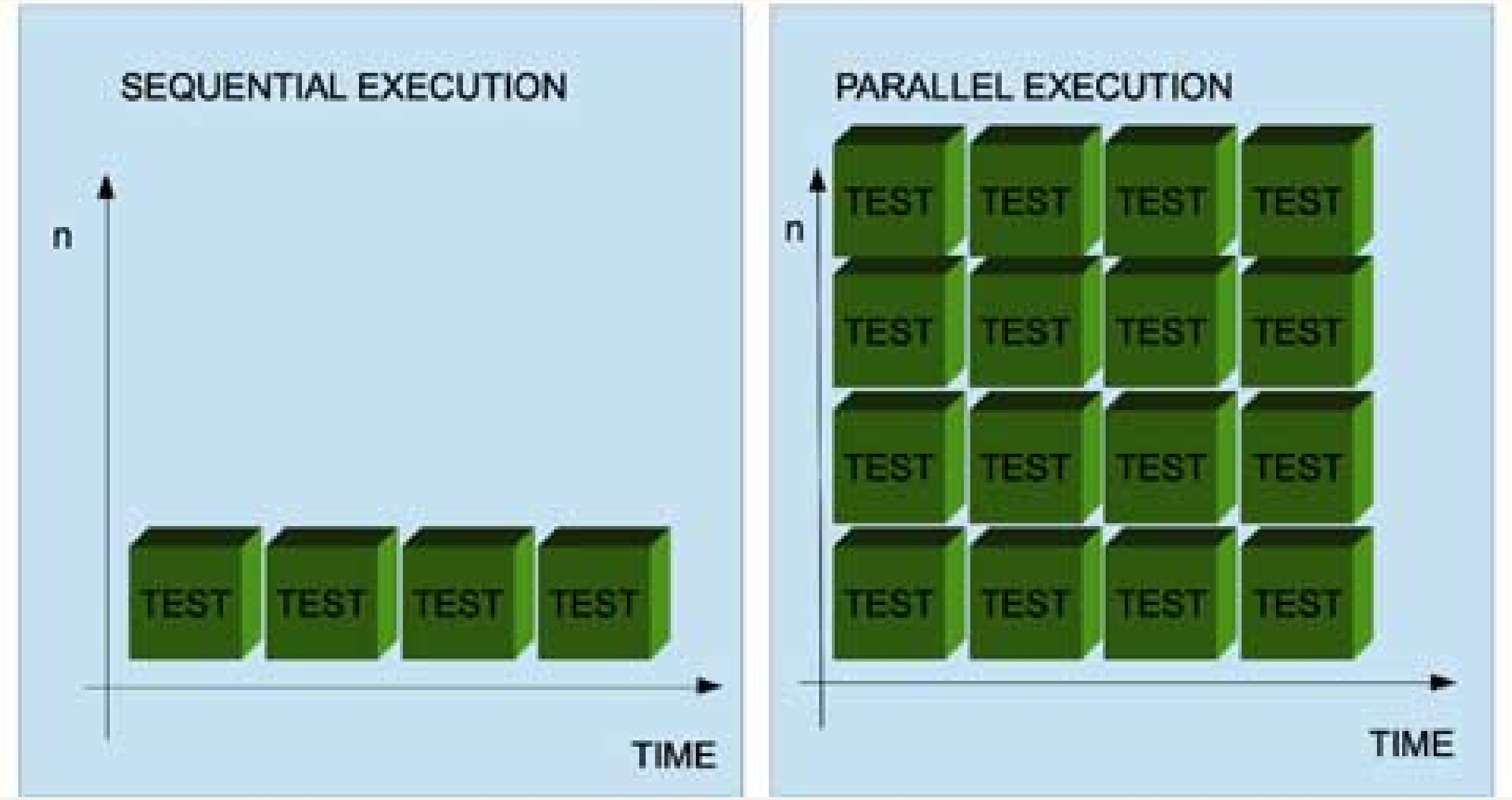
DOWNSTREAM SERVICES WITH DATA CREATION APIS

```
@pytest.fixture
def question(question_answer_client, business_id, confirmed_user_id):
    return question_answer_client.business.create_question(
        body={
            'text': 'Test question...?',
            'platform_source': 'other',
            'subscription': False,
        },
        business_id=business_id,
    ).result().question
```

PROS AND CONS

- Natural fit for pytest fixtures
- Much easier data creation
- People create separate data entries for each test "automatically"
- Need to maintain data creation factories
- Potentially slower (not sharing data across tests)

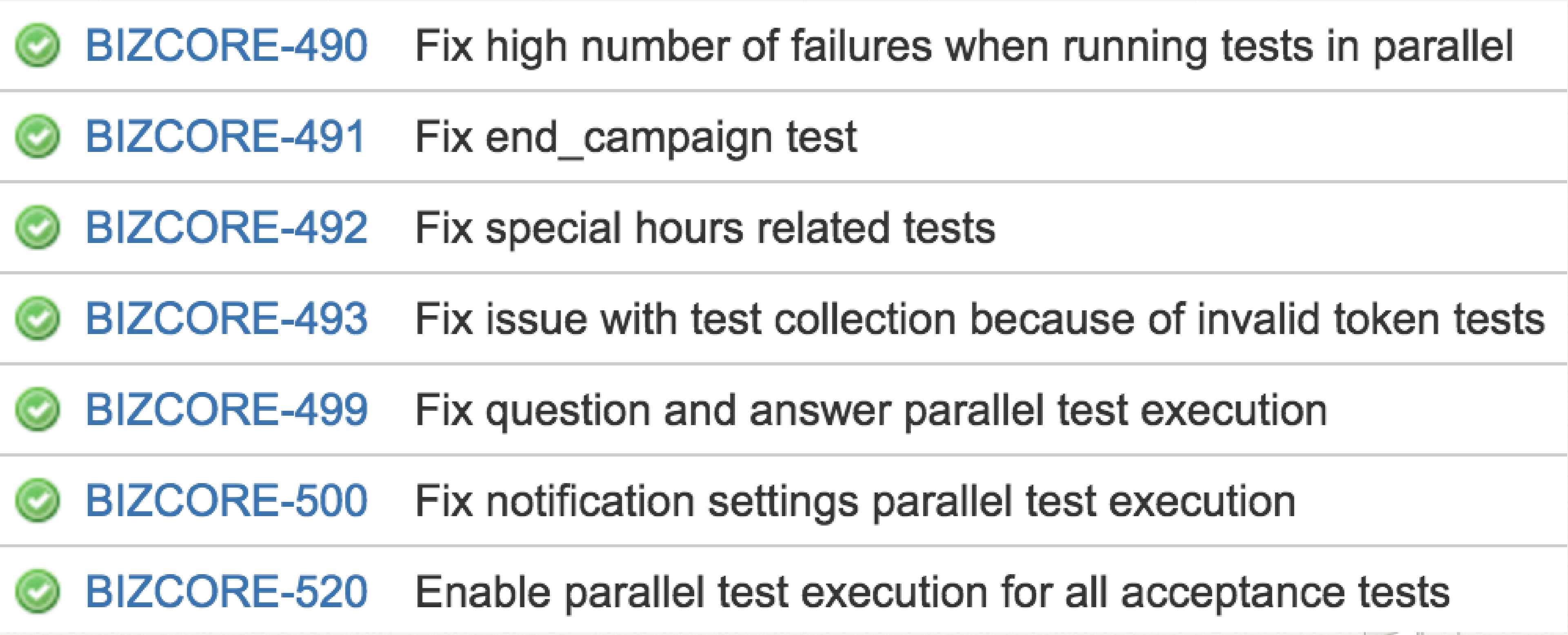
HOW TO MAKE TESTS FASTER



Source: http://www.methodsandtools.com/tools/selendroid.html

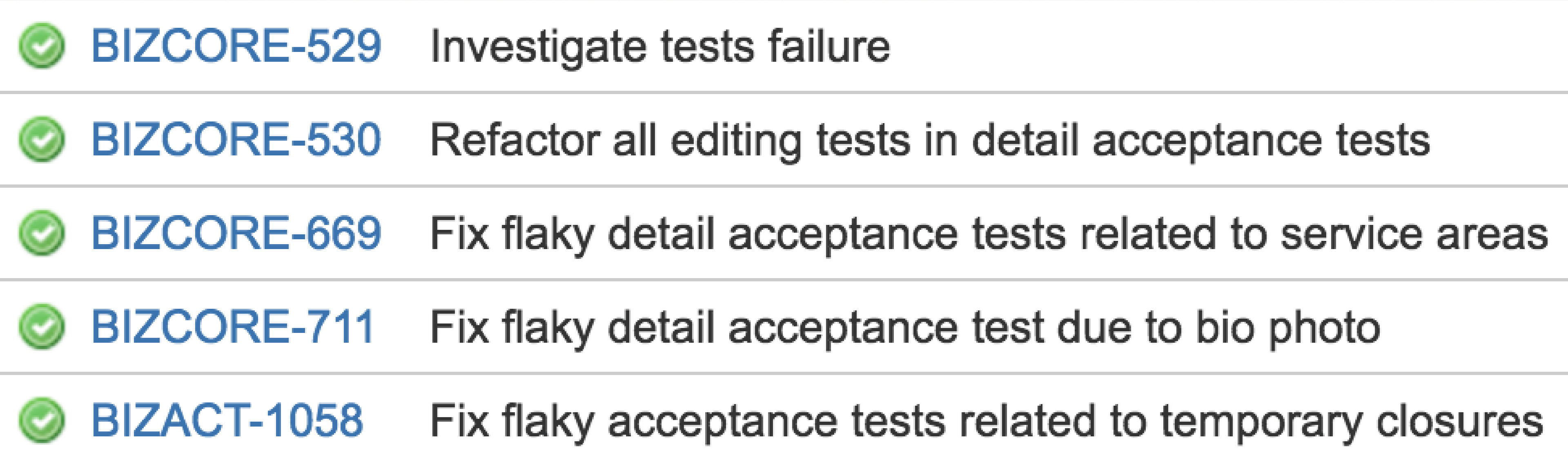
EXECUTE TESTS IN PARALLEL WITH PYTEST

```
$ pip install pytest-xdist
$ python -m pytest -s -vvv -n 4 tests/acceptance
```



✓	BIZCORE-490	Fix high number of failures when running tests in parallel
✓	BIZCORE-491	Fix end_campaign test
✓	BIZCORE-492	Fix special hours related tests
✓	BIZCORE-493	Fix issue with test collection because of invalid token tests
✓	BIZCORE-499	Fix question and answer parallel test execution
✓	BIZCORE-500	Fix notification settings parallel test execution
✓	BIZCORE-520	Enable parallel test execution for all acceptance tests

EXECUTE TESTS IN PARALLEL WITH PYTEST



✓	BIZCORE-529	Investigate tests failure
✓	BIZCORE-530	Refactor all editing tests in detail acceptance tests
✓	BIZCORE-669	Fix flaky detail acceptance tests related to service areas
✓	BIZCORE-711	Fix flaky detail acceptance test due to bio photo
✓	BIZACT-1058	Fix flaky acceptance tests related to temporary closures

TAKEAWAYS

- Use fixture factories for **faster development** and more correct test data
- Convert tests for **test isolation and repeatability**
- Take advantage of it by executing tests in **parallel**

OTHER TALKS BY YELPERS

"Write more decorators (and fewer classes)"
by Antonio Verardi; Tuesday, 10:30, Anfiteatro 2

"Teeing up Python: Code Golf"
by Lee Sheng; Wednesday, 12:10, PyCharm Room

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engineeringblog.yelp.com

github.com/yelp

QUESTIONS?

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https://github.com/sjaensch/faster_end_to_end_tests_talk.git