You need a local emulator?

Yves Goeleven

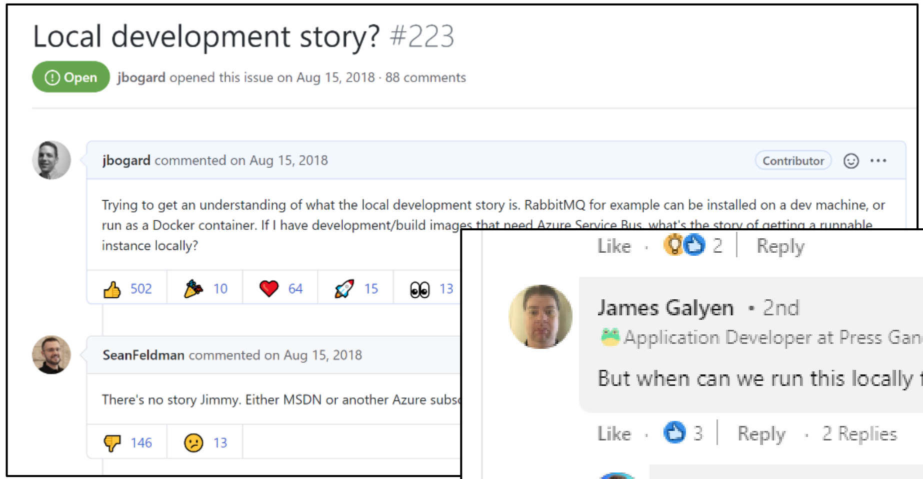
Independent Solution Architect

- My mission is to simplify distributed software development on Azure
- 22 years of experience, in Azure since 2008
- Co-founder AZUG, crew member Cloudbrew, first belgian Azure MVP
- Still building software (for) myself
  - www.clubmanagement.io
  - www.messagehandler.net

I need a local emulator!

I need a local emulator

Most common feedback for all Azure Services



Local development story? #223

Open jbogard opened this issue on Aug 15, 2018 · 88 comments

jbogard commented on Aug 15, 2018 Contributor

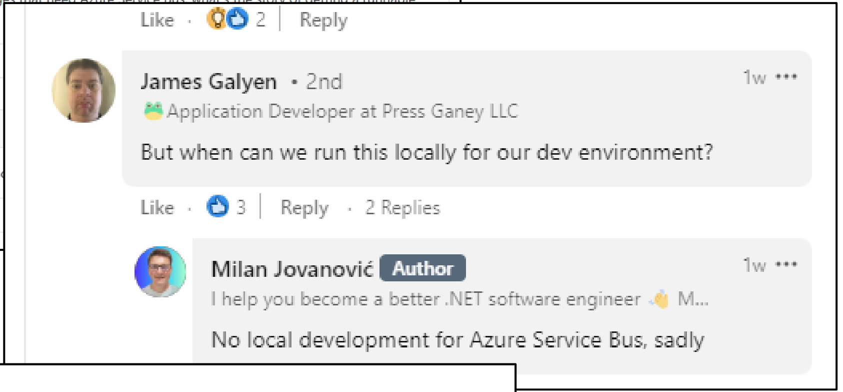
Trying to get an understanding of what the local development story is. RabbitMQ for example can be installed on a dev machine, or run as a Docker container. If I have development/build images that need Azure Service Bus, what's the story of getting a runnable instance locally?

👍 502 🎉 10 ❤️ 64 🚀 15 👀 13

SeanFeldman commented on Aug 15, 2018

There's no story Jimmy. Either MSDN or another Azure subs

👎 146 😕 13



Like · 2 | Reply

James Galyen • 2nd 1w

Application Developer at Press Ganey LLC

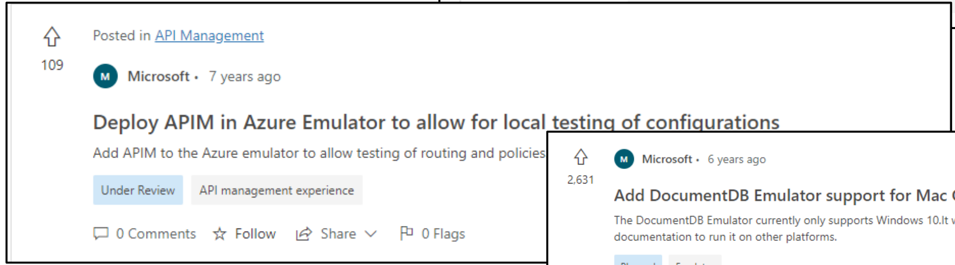
But when can we run this locally for our dev environment?

Like · 3 | Reply · 2 Replies

Milan Jovanović Author 1w

I help you become a better .NET software engineer 👋 M...

No local development for Azure Service Bus, sadly



109

Posted in API Management

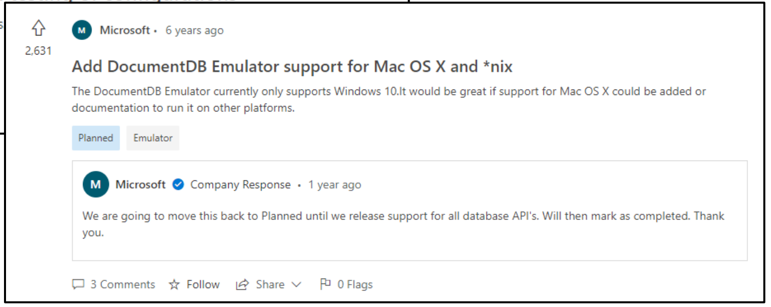
Microsoft • 7 years ago

Deploy APIM in Azure Emulator to allow for local testing of configurations

Add APIM to the Azure emulator to allow testing of routing and policies

Under Review | API management experience

0 Comments · Follow · Share · 0 Flags



2,631

Microsoft • 6 years ago

Add DocumentDB Emulator support for Mac OS X and *nix

The DocumentDB Emulator currently only supports Windows 10.It would be great if support for Mac OS X could be added or documentation to run it on other platforms.

Planned | Emulator

Microsoft Company Response • 1 year ago

We are going to move this back to Planned until we release support for all database API's. Will then mark as completed. Thank you.

3 Comments · Follow · Share · 0 Flags

Origin of the question

Good reasons people ask for this

- The ability to run an app offline
- To eliminate latency
- Improve test performance
- Environment per developer
- Test isolation
- Easier to debug state locally
- Avoiding development costs

You don’t need no stinking emulator!

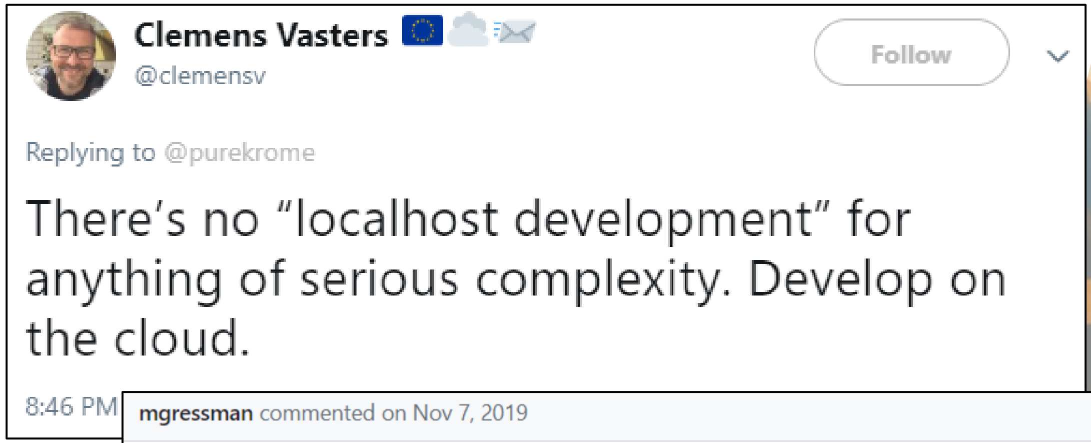
Why not?

Good reasons not to use emulators

- When your system fits on your laptop, do you really need a cloud?
- Emulators behave different from the real service
  - E.g. different response codes
  - Service limits are vastly different. (rps)
- Emulators are not hostile towards your code
  - E.g. throttling
- Latency matters: more likely to result in chatty code
- You need to know your operational costs asap
  - How you code makes a massive difference

The tension is rising

Old men arguing on the internet

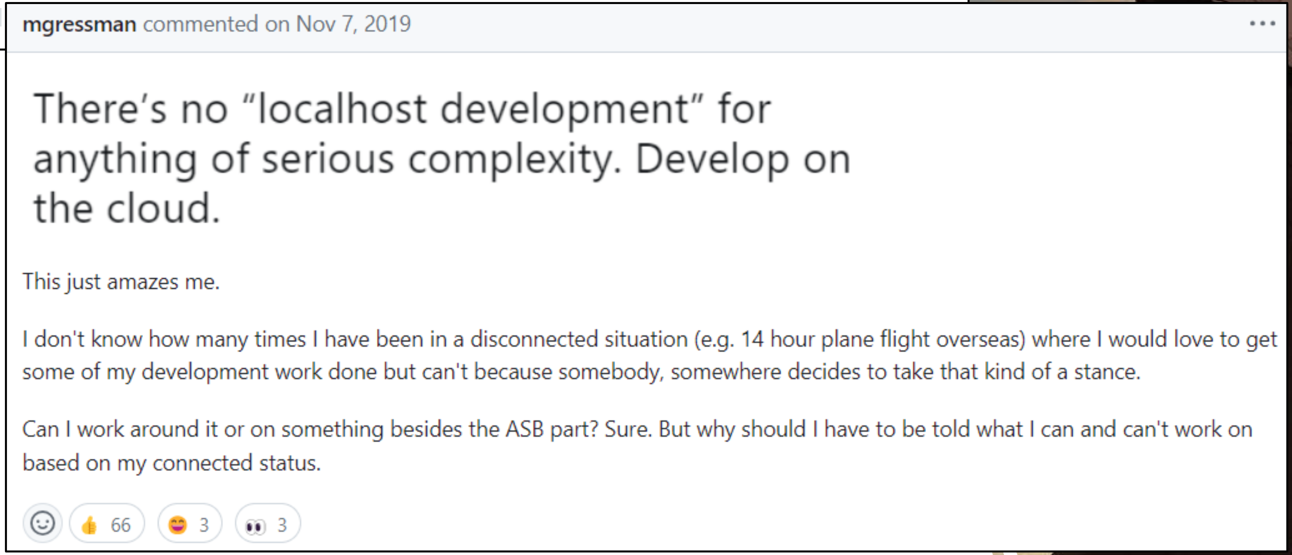


Clemens Vasters
@clemensv

Replying to @purekrome

There’s no “localhost development” for anything of serious complexity. Develop on the cloud.

8:46 PM



mgressman commented on Nov 7, 2019

> There’s no “localhost development” for anything of serious complexity. Develop on the cloud.

This just amazes me.

I don't know how many times I have been in a disconnected situation (e.g. 14 hour plane flight overseas) where I would love to get some of my development work done but can't because somebody, somewhere decides to take that kind of a stance.

Can I work around it or on something besides the ASB part? Sure. But why should I have to be told what I can and can't work on based on my connected status.

👍 66 😄 3 👀 3

How to solve this dilemma?

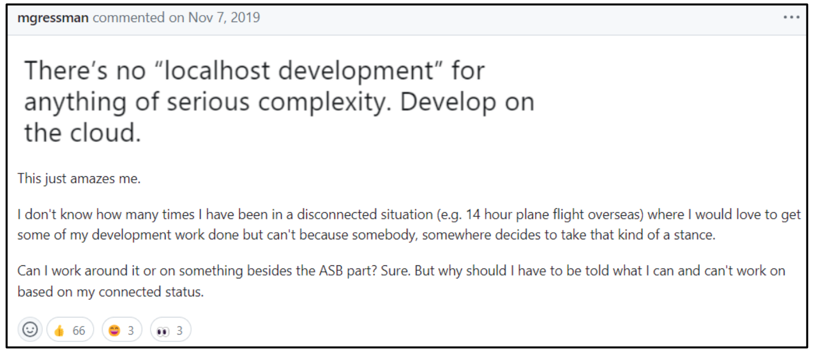
Root cause: Bad testing practices

The testing pyramid

How it is supposed to work

- 1 Manual test
- 10 Integration tests
- 100 Component tests
- 1000 Unit tests

- This person is testing manually



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👍 66 😄 3 👀 3

What most of us do

Our pyramids tend to be a bit top heavy

- 100 Manual tests
- 1000 Integration tests
- 100 Component tests
- 1000 Unit tests

Why ?

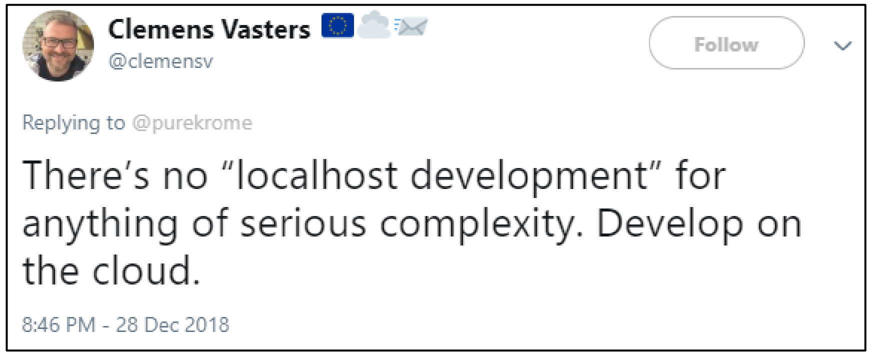
Multiple reasons

- Don’t trust unit tests
- Desire to visually confirm
- Fail to decompose our business domain
- Disconnect QA & Dev

Distrust in unit tests

Fake data not matching real data

- Unit tests use fake data
- Not in correspondence with reality
- Therefore need for more
  - Manual & Integration tests
- Using real data
- Thus, need for a live system
  - Works only for small systems



Clemens Vasters
@clemensv

Follow

Replying to @purekrome

There's no "localhost development" for anything of serious complexity. Develop on the cloud.

8:46 PM - 28 Dec 2018

Testing strategy

Add contract testing

Tests for your test data

- Tests for your test data
- Perform a few narrow integration tests
  - Against the real service
  - Serialize and store output in a verification file
- In a contract test
  - Assert the test data against verification
  - Use equality or equivalence assertions
- You can now trust your test data suite
  - Reuse in 1000s of unit and component tests
  - Without hitting the network

Manual assertions

Using string comparison

- Serialize actual test data to file
- Expectation in verification file
- Assert.Equal(expected, actual)

- Benefits
  - Absolute equality
  - Diff tools allow you to inspect the file content visually

- Downsides
  - Manual file management
  - Some properties may vary between runs, e.g. timestamps

Verification frameworks

Using Verify (By Simon Cropp)

- No file management needed
- Available for multiple dependency types

- Supports ‘Scrubbers’
  - Replaces values of certain types
  - Timestamps, guids, machine name, …

- Alternatives:
  - Use BeEquivalentTo comparison of Fluent Assertions on deserialized verification files
  - Pact.Net, biased towards API output only

DEMO: Integration testing

DEMO: Contract testing

New testing pyramid

How it can actually work

- 1 Manual test
- 10 Integration tests
- **100 Contract tests**
- 1000 Component tests
- 10000 Unit tests

10 Seconds

I challenged my team

Keep individual test runs below 10 seconds

- Additional practices
  - IO To the boundary
  - Proper functional decomposition

IO to the boundary

Only IO at specific points in call stack

- At an entry point
    - e.g. API controller
    - Load all data needed for the transition
- No IO in the middle
- At the exit point
    - 1 outbound IO operation
    - e.g. Save
    - Maximum 1!!!!!!!!
- Makes component testing a lot easier

Demo: IO to the boundary & Component tests

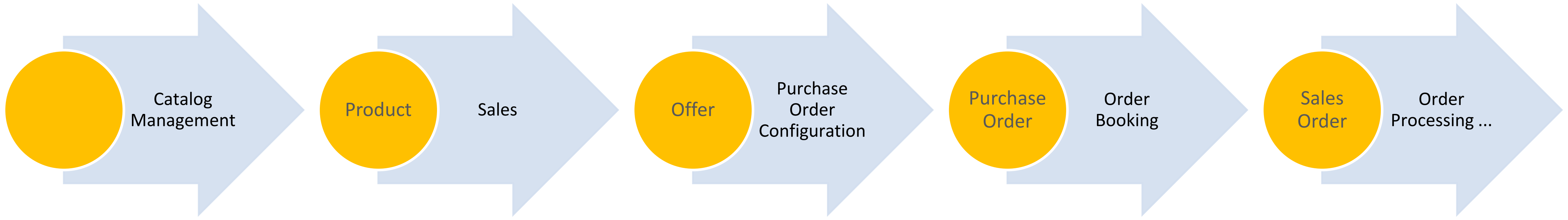
DEMO: Full Test Run & Unit Tests

Functional Decomposition

Failure to decompose business processes

Need for proper functional decomposition

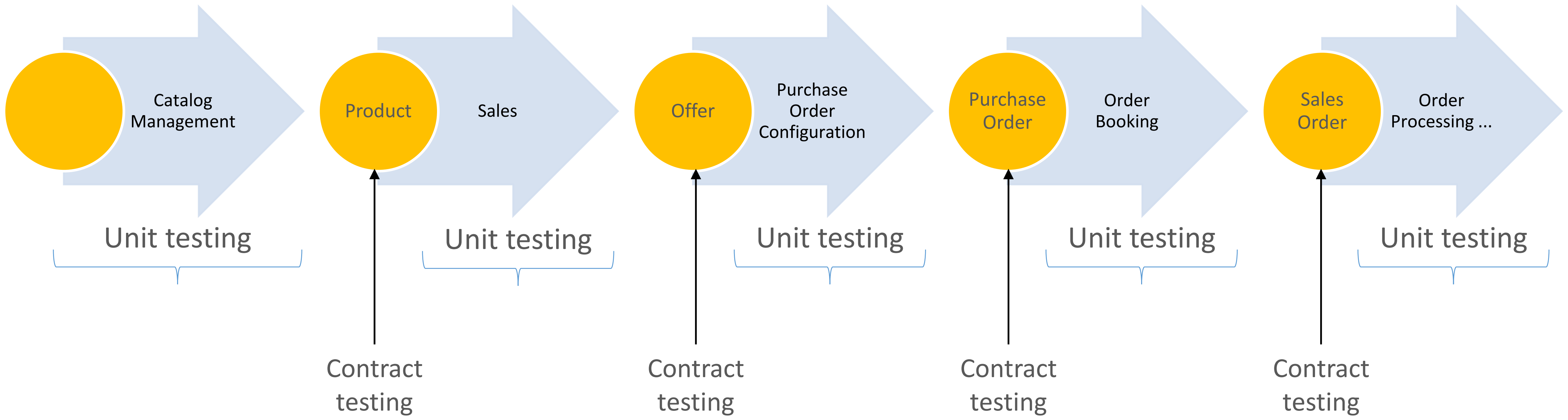
- All data is the result of process transitions (business capabilities)
- Tendency to see, and test, this process as a whole
- Resulting in manual tests or broad integration tests (E2E tests)



Replace slow end to end tests

With sequences of unit testing and contract testing

- The transitions can be tested using unit testing
- The exchanged data through contract testing



Share contract tests

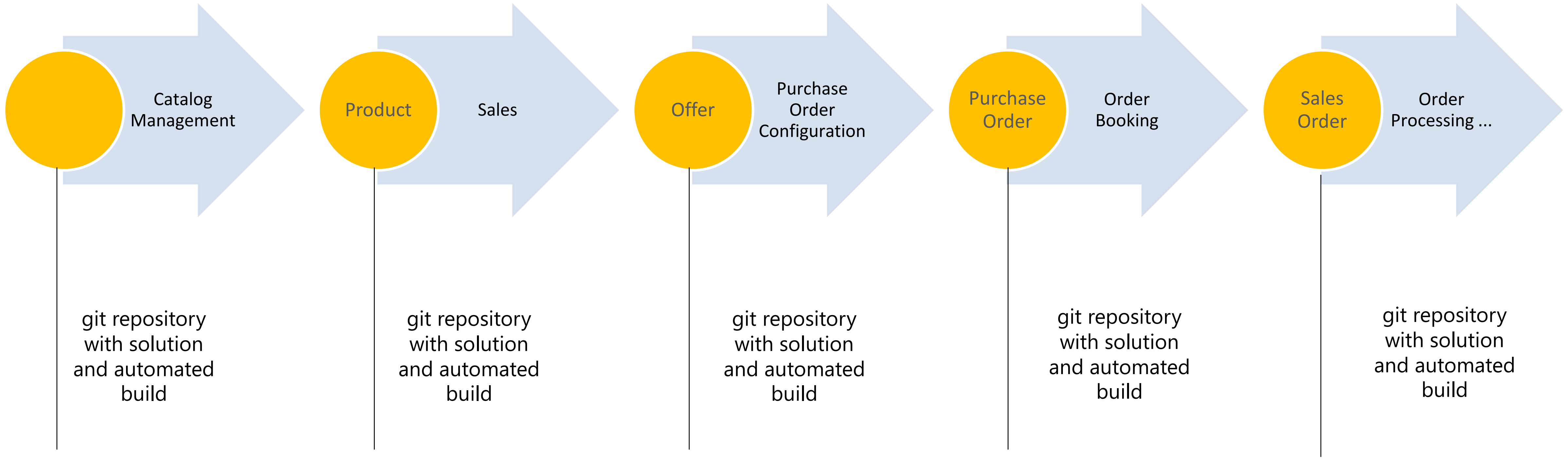
With the dependents of your API

- Write contract tests for your own API
- Embed tests & verification files in source package
- Share with dependents
- Run tests on both ends
- Both teams can now trust the test suite

Split your code base

To keep test runs short

- Separate git repository or solution per business capability
- With automated build and test run


Catalog Management
Product
Sales
Offer
Purchase Order Configuration
Purchase Order
Order Booking
Sales Order
Order Processing ...
git repository with solution and automated build
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UI snapshot test

Just another contract test

- Instead of serializing in JSON
- Serialize in HTML (or XAML, or bitmap)

- Perform equality or equivalence comparisons

- Verify: Blazor, Images, Xamarin, Xaml, …
- Jest: HTML, CSS, JS, Images, …

QA Feedback loop

Organizational Trust

It does not matter you trust your tests

- When QA doesn’t know about, or does not trust, the unit test set
- They will still test manually
- Or use slow end to end integration tests

Set up feedback loop

Part 1

- During sprint planning talk about the end to end scenarios
- Map the end to end scenarios to Unit tests
  - Visual Studio / Azure Devops
- Let QA team review the unit tests for readability

Set up feedback loop

Part 2

- Replicate any bug as a failing unit test
  - Before fixing it
- Let QA report exploratory tests that succeeded
  - Add these as a unit test
- Eventually all scenarios will get covered
- Visualize on a dashboard
  - Report unit tests results
  - Aggregate per end to end scenario

Before you run

A Summary

- Adjust your testing practices
- Use real services, but sparingly
- Ensure an in-memory dataset that you and your organization can trust.
- Set up a feedback loop to improve your test suite over time

Thank you for your attention

Additional resources

- Simon Cropp's Verify Framework
  - https://github.com/VerifyTests/
- Dennis Doomen's Fluent Assertion Framework
  - https://github.com/fluentassertions/fluentassertions
- Pact Foundation, Pact.Net
  - https://github.com/pact-foundation/pact-net
- Jest Snapshot Testing
  - https://jestjs.io/docs/snapshot-testing
- Associate automated unit tests with test cases
  - https://learn.microsoft.com/en-us/azure/devops/test/associate-automated-test-with-test-case?view=azure-devops

LinkedIn/Goeleven