



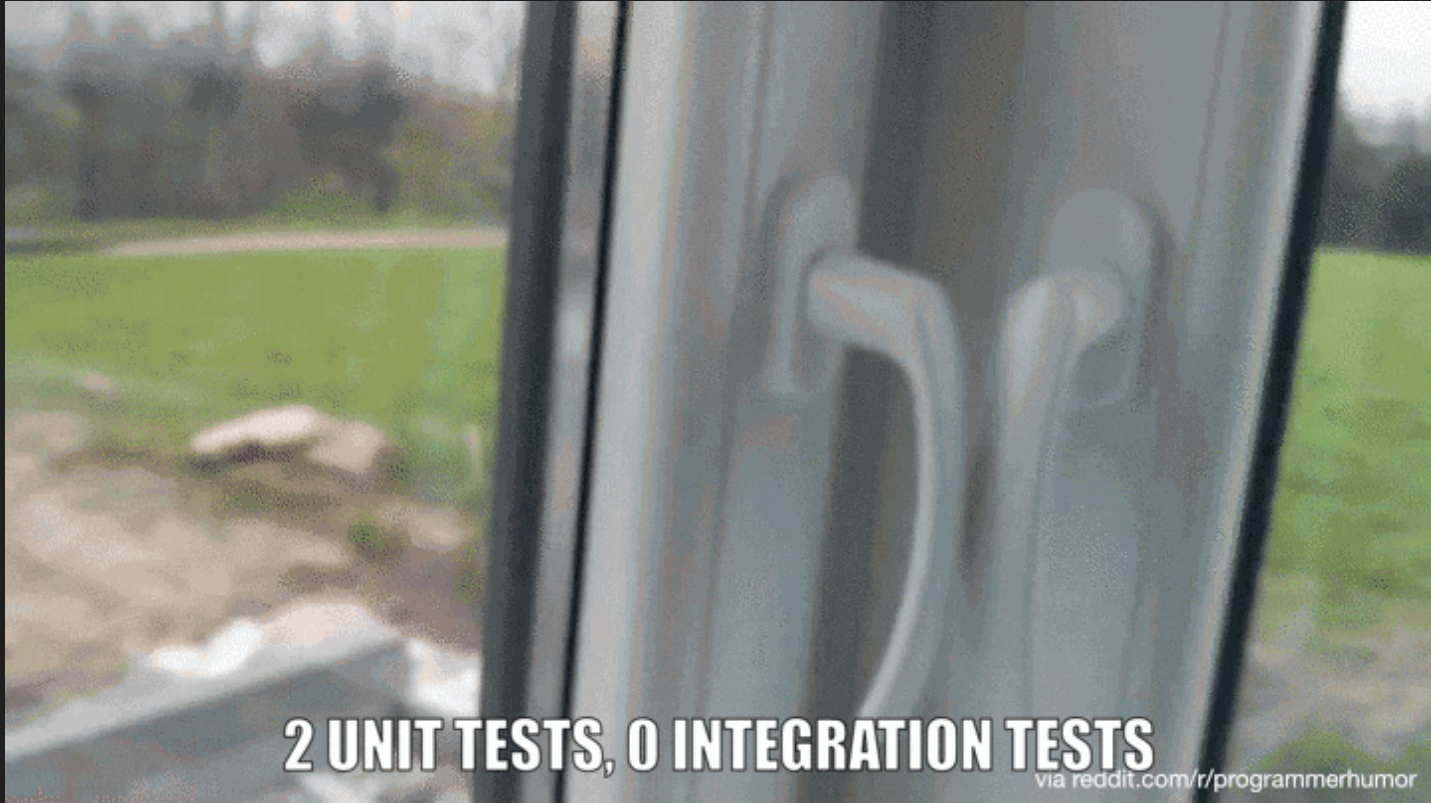
# SYNERGEX TECH DAYS 2019

How many users does it take to break an app?

# Load Testing

**Load testing** generally refers to the practice of modeling the expected usage of a software program by simulating multiple users accessing the program concurrently.

We have unit tests for that



# Who is the presentation for?

## **This is for you if...**

- Customers interact with your applications over a network (excluding RDP)
  - Network-separated tiers generally make testing much easier
  - Cloud-based load testing services all work best over HTTPS
  - WCF is not a primary target but still very doable
- Fat client desktop is possible, but much different

# So I don't need unit tests?

- You still need unit tests
- You still need integration tests
- You probably still need UI tests

# I have a low volume API why should I care?

- Find concurrency issues
  - These will still happen in your low-volume production environment!
  - They are impossible to debug in production
- Usually end up doubling as a really good integration test
  - Non-hardcoded data validation

# Account balance transfer

- Pick two random account records
- Transfer a random percentage of the current balance from one account to the other
- Account balance can never go below 0
- Repeat
- Read all account records
- Add all balances
- Ensure the total balance is equal to the total starting balance

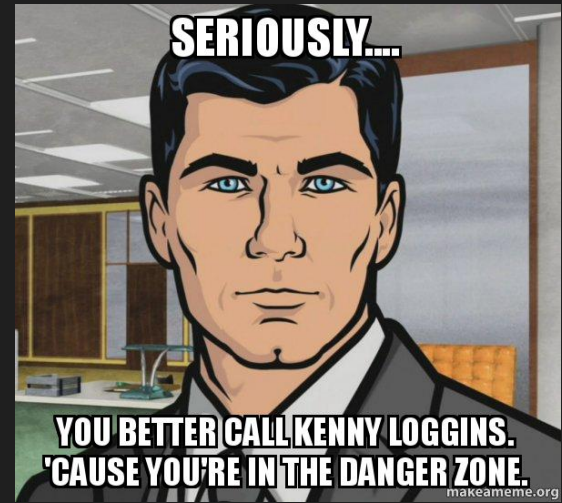
# What can go wrong?

- Optimistic concurrency could result in account balances below 0.
- If you only lock one record at a time, you will end up with phantom balance changes.
- Without locking all records, it's not possible to calculate the total account balance while transfers are still taking place.



# Dangerous code

- Changing global state at runtime
  - Globals
  - Commons
  - Static fields
- Classes that wrap an ISAM channel
  - Closing a channel in the destructor is non-deterministic
    - Don't ever do this if you use *xfServer*
  - Explicit close or dispose that doesn't zero the channel variable
  - Calling close multiple times on the same channel number
    - If timing is just right, the channel number will get reallocated prior to the second close invocation



# HttpClient tests using C# / Synergy .NET

- Code sample to test account balance transfer
  - Use JSON Patch doc with verification of account balance

# HttpClient tests

- Design your tests to not collide
  - Get all items in a list
  - Submit a reversible change to all items
  - Validate that the items changed correctly
  - Reverse the change
  - Validate that the original values are now present
- Build a test coordinator
  - Don't use this for all your tests
  - Coordinator needs to be concurrency safe
    - `System.Collections.Generic.Concurrent` helps here

# Don't use Visual Studio load testing tools

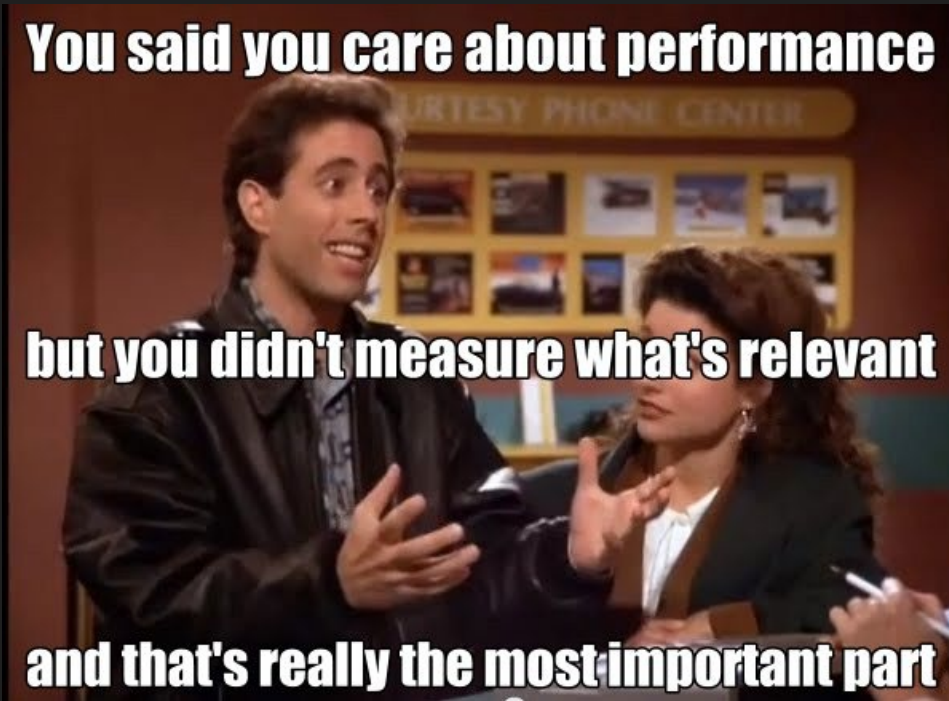
- Visual Studio 2019 is the last version that will support load testing.
- Azure is dropping support for running load tests in 2020.

# Cloud load testing

- Micro Focus LoadRunner
- SmartBear LoadNinja
- BlazeMeter
  - Jmeter-specific hosting
  
- Easier to simulate 1000 users in the cloud
- Service needs to be publicly available

# Do I wanna know?

- Yes!!!
- Unresponsive web/hybrid/thin apps really anger users



# What do I do about it?

- Traditional Synergy has a profiler
  - It works with regular DBRs, *xfServerPlus*, and Traditional Bridge
  - Call Synergy/DE Developer Support
- .NET has a profiler built into Visual Studio
- JetBrains DotProfile, DotMemory
  - Both tools make perf work much more productive

# So it's good now. How do I keep it that way?

- Run your load tests from your dev ops pipeline.
  - The closer to production you are, the more accurate the results will be.
  - If you're not running similar hardware to production, only look at relative difference between runs.
- JetBrains has unit test integration.
  - Make sure your unit test performance profile doesn't get worse over time.
  - Suddenly allocating 50% more memory is probably something you should take a look at.





# So it's good now. How do I keep it that way?

- **Application Performance Monitoring tools**
  - Splunk
  - Solarwinds APM
  - Stackify
  - NewRelic
- APM tools all allow you to do custom logging
  - Harmony Core does some of this for you
  - You can log things like Synergy I/O ops
  - *xf*Server connection/disconnection
- Alerts when abnormal things happen



Who has the first question?