The Actor Model as a Load Testing Framework

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An analogy
The Tacoma Bridge
The (virtual) Tacoma Bridges
The (virtual) Tacoma Bridges

- Interactions?
- Traffic capacity?
- Amplifying factor?
- Old forces that only now start to matter?
Framework

- A framework is a generic term commonly referring to an essential supporting structure which other things are built on top of. [Wikipedia]

- A supporting structure around which something can be built [Cambridge dictionary]

- A system of rules, ideas, or beliefs that is used to plan or decide something [Cambridge dictionary]
**Framework**

A system of rules, ideas, or beliefs that is used to plan or decide something

[Cambridge dictionary]

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**Model**

A system of postulates, data, and inferences presented as a mathematical description of an entity

[Merriam-Webster]
Testing

The process of using or trying something to see if it works, is suitable, obeys the rules, etc. [Cambridge dictionary]

Load

A mass or quantity of something taken up and carried, conveyed, or transported [Thesaurus]
Load Testing

The process of trying something can carry a mass or quantity of work, and verify how it behaves under varying such quantities:

- **Performance** — at minimum load
- **Load** — at very high load
- **Stress** — at failure
Load Testing Framework

A system of tools and ideas to apply loads in all the possible ways the system *allows*:

- Unit of measurement
- Interactions
The loads

The forces

The users
Actors

An Actor can, in response to a message it receives:

- send a finite number of messages to other Actors
- create a finite number of new Actors
- designate the behavior to be used for the next message it receives
The universal primitive

Everything is a...
Light thickens, and the crow/
Makes wing to the rooky wood.

Shakespeare, Macbeth, Act 3, Scene 2
A Murder of Crows

- Interactions?
- Traffic capacity?
- Amplifying factor?
- Old new forces?
Forces in play

Say we have a chat system:

- Session establishment
- Send messages
- Fetch your archives
- Join/leave group-chats
- (And much more stuff)
Run all the actors

- *init* a scenario, once
  - Metrics, conditions, databases

- *Start* all the actors, every single time
  - Each actor executes its force

- Run the scenario
  - Locally or distributed
Throttle

Set a Rate per Interval for an action

- Progressive rate control
- Actors wait for throttler’s approval
- Actors ask other actors to wait for throttler’s approval
Coordinate

— Pick a number of users for an action
  ○ all
  ○ a list
  ○ a set of distinct pairs

— Users are given to a callback as they join the coordination plan
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