Cloud native & Reactive Programming

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Agenda

- Cloud native
- Reactive programming
- RSocket broker deployment model: the cloud native way

On the Development of Reactive Systems*

D. Harel and A. Pnueli

Department of Applied Mathematics
The Weizmann Institute of Science
Rehovot 76100, Israel

January, 1985

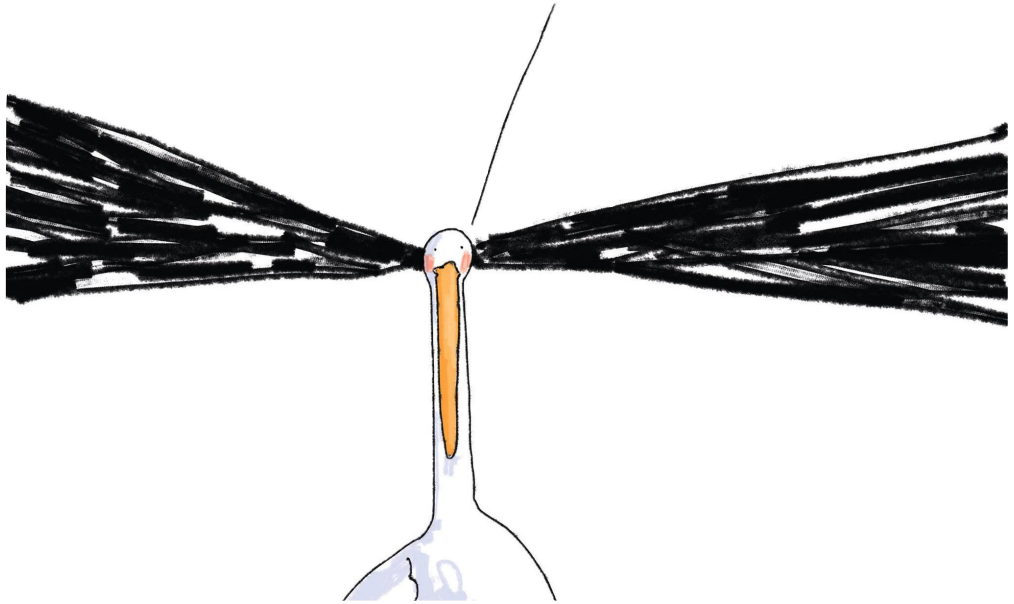
Abstract

Some observations are made concerning the process of developing complex systems. A broad class of systems, termed *reactive*, is singled out as being particularly problematic when it comes to finding satisfactory methods for behavioral description. In this paper we recommend the recently proposed statechart method for this purpose. Moreover, it is observed that most reactive systems cannot be developed in a linear stepwise fashion, but, rather, give rise to a two-dimensional development process, featuring behavioral aspects in the one dimension and implementational ones in the other. Concurrency may occur in both dimensions, as *orthogonality* of states in the one and as *parallelism* of subsystems in the other. A preliminary approach to working one's way through this "magic square" of system development is then presented. The ideas described herein seem to be relevant to a wide variety of application areas.

Why Another Paper on System Development?

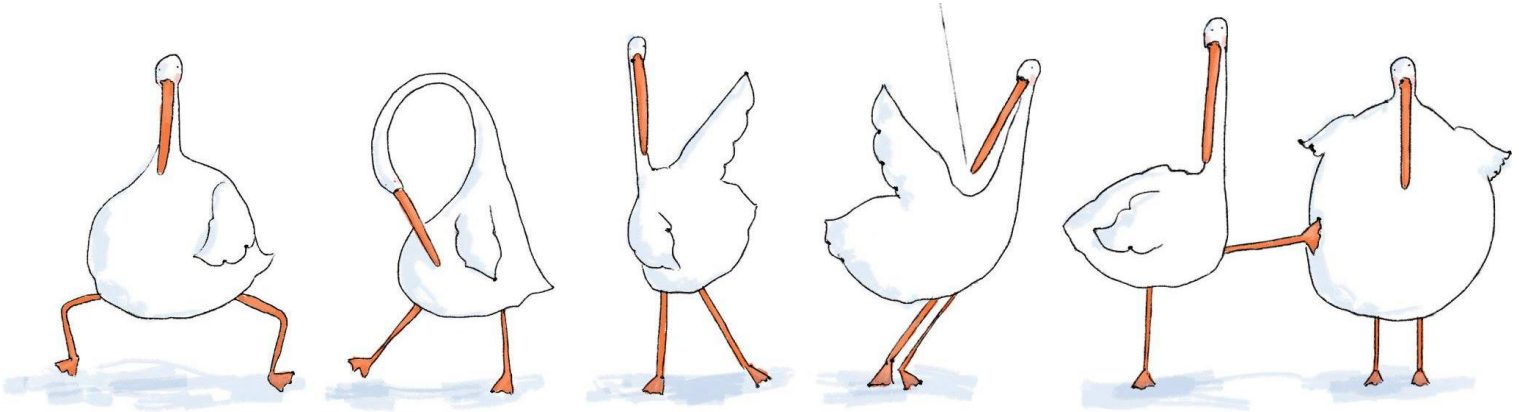
The literature on software engineering, programming languages, and system and hardware design, is brimming with papers describing methods for specifying and designing large and complex systems. Why then are we

The Reactive System - is type of the system which reacts to all the events



Non-Reactive vs. Reactive Systems

- **Non Reactive** System - process events **selectively** and **not necessarily on time**
- Reactive System - change its behavior as a result of REACTION to all the events



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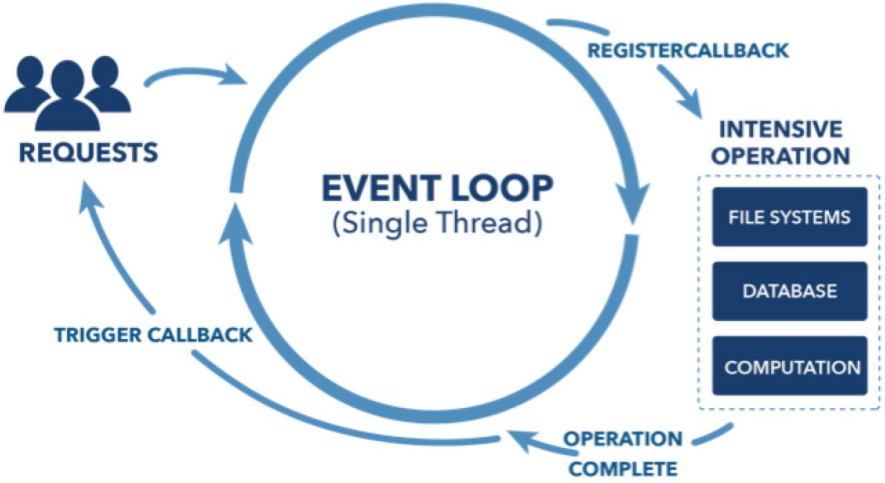
Cloud native challenges

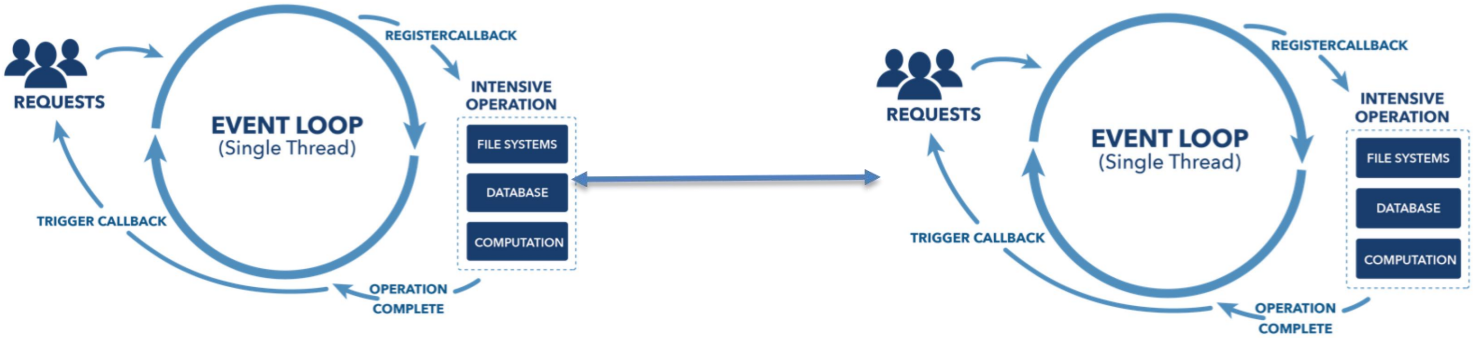
- Communication between services
- Has not been solved since distributed application era

NON-BLOCKING I/O



TECH | NON-BLOCKING I/O

TECH | NON-BLOCKING I/O



Considerations

- Message =/= Message Queue
- Message Queue vs. Protocol?

Cloud Infrastructure

- Service Mesh

Alibaba Netifi Broker

- Apply for JWT token : http://118.31.22.206:8081/
- Try out the demo

Thank You!

What is Reactive Streams?

- Keyword: Distributed architecture
- All distributed operations are asynchronous
- We **need** to stop wrapping those operations in a synchronous way
- Non-Blocking mechanisms
  - Callback-based, Rx/Reactor, Co-routines, Async/Await...