Akka Actor Basic Tour

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This talk was compiled with tut

```
import akka.actor.{ActorRef, ActorSystem, DeadLetter, Inbox, Props
import com.typesafe.config.ConfigFactory

import scala.concurrent.Await
import scala.concurrent.duration._
```

Akka

- Built by Lightbend
- Toolkit
- A set of open-source libraries (modules) for designing scalable, resilient systems
    - Actors: local, remote, typed
    - Network: Akka cluster, Cluster Sharding
    - Stream
    - Akka HTTP

Actor Model

- A computational model invented decades ago by Hewitt, Bishop and Steiger in 1973
- Actor - A computational entity, 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
- Decoupled on three axes:
  - Space
  - Time
  - Interface

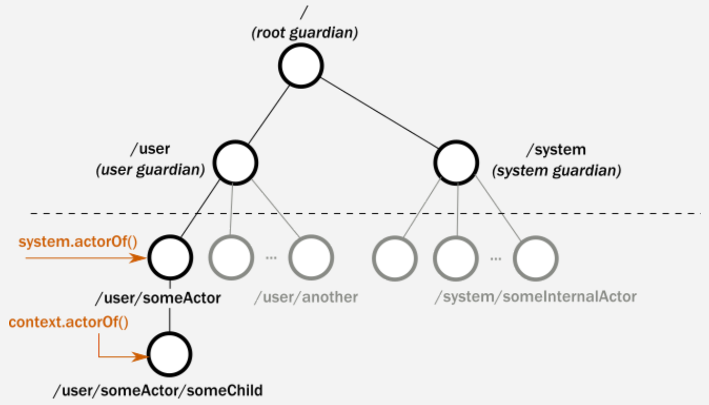
Actor System

- Create just one actor system per application in general*
- Collects a hierarchy of actors, which share the same configuration
  - Mailbox types
  - How remote actors are accessed
  - Declarations of dispatchers that execute actors on threads
  - Other system and actor properties
- We can create an actor system named actorsystem with default configuration:

```
val system = ActorSystem("actorsystem")
```

Actor System (Cont'd)

- When actor system is created, *root guardian*, *user guardian* and *system guardian* are created along with it.



Supervision and Monitor

- Let it crash
- Actor System supervision describes a dependency relationship between actors:
- Supervisor delegates tasks to subordinates and therefore must respond to their failures
- When a subordinate detects a failure (i.e. throws an exception), it suspends itself and all its subordinates and sends a message to its supervisor, signaling failure.
- Supervisor can
    - Resume
    - Restart
    - Stop
    - Escalate

Actor, ActorRef and Mailbox

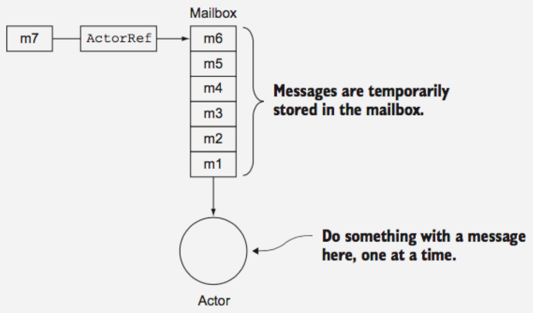
- We can create an actor named worker in the actor system

```
val worker: ActorRef = system.actorOf(Props[Worker], "worker")
```

- Messages are sent to the actor’s ActorRef.

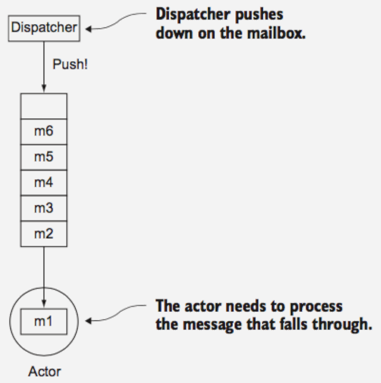
```
worker ! "Hello World!"
```

- Every actor has a mailbox like a queue.


Mailbox
m7
ActorRef
m6
m5
m4
m3
m2
m1
Messages are temporarily stored in the mailbox.
Do something with a message here, one at a time.
Actor

Dispatcher

- Invoke actors by pushing the messages in the mailbox


Dispatcher
Dispatcher pushes down on the mailbox.
Push!
m6
m5
m4
m3
m2
m1
The actor needs to process the message that falls through.
Actor

  through the actors
- Actors are lightweight because they run on top of dispatchers
- Actors aren’t necessarily directly proportional to the number of threads

Demo

References

- Akka Docs: http://akka.io/docs/
- Reactive Messaging Patterns with Actor Model: https://github.com/VaughnVernon/ReactiveMessagingPatterns_A
- Akka in Acton: https://www.manning.com/books/akka-in-action