A Gentle Adventure Mechanising Message Passing Concurrency Systems

An experience report/walkthrough.

VEST 2021

Based on work by: David Castro Pérez, Francisco Ferreira, Lorenzo Gheri, and Nobuko Yoshida.

The Story so Far

Nobuko

The Story so Far

Nobuko

Francisco

The Story so Far

Let's work on mechanisation!

Nobuko

Francisco

The Story so Far

The Story so Far

Nobuko

Francisco

David

The Story so Far

Nobuko

Francisco

David

The Story so Far

The Story so Far

Nobuko

Francisco

David

The Story so Far

Nobuko Francisco David Lorenzo

This Brings us to Today (1)

Nobuko

Francisco

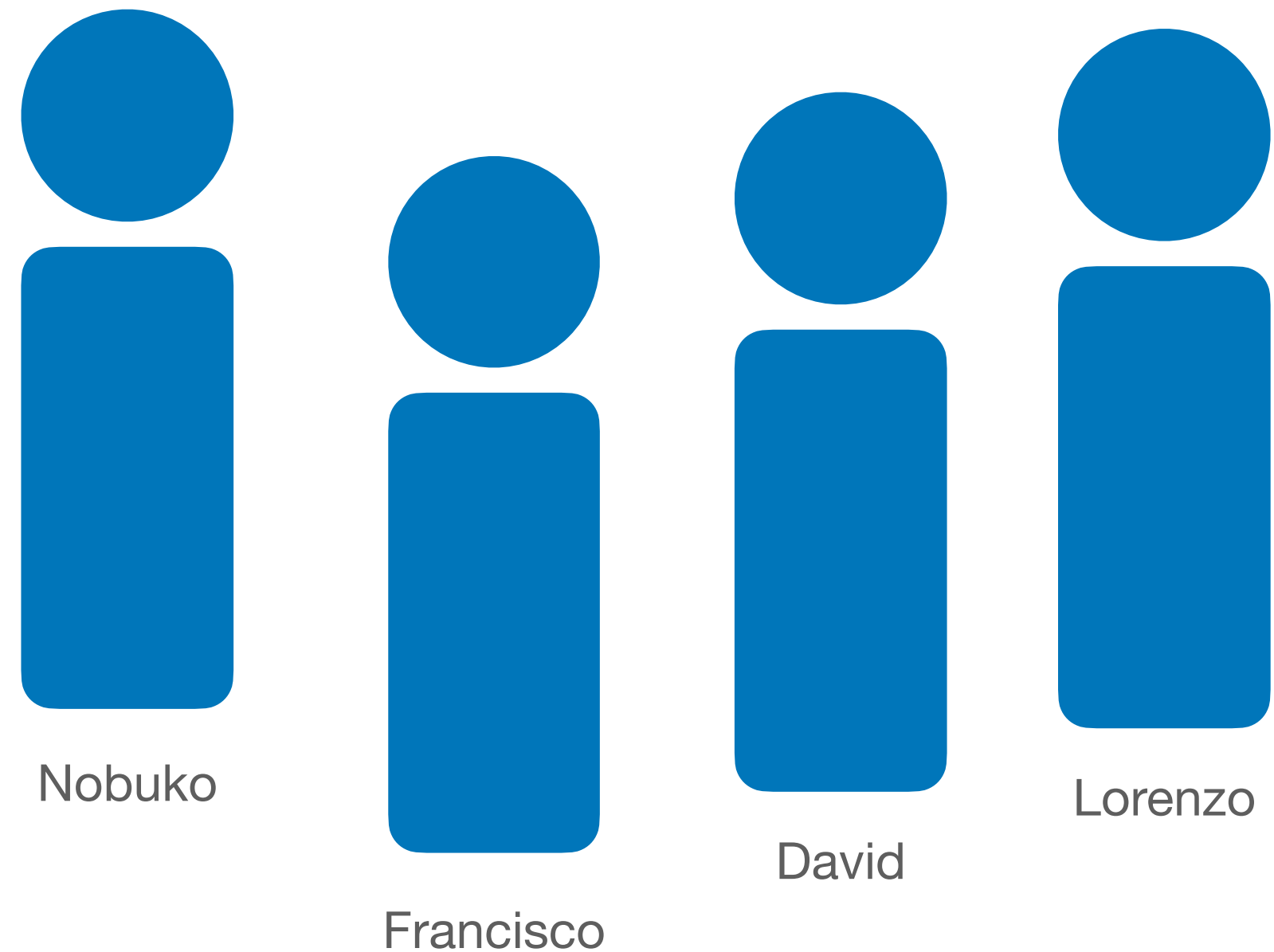David

Lorenzo

- We formalised:

  - Binary Session Types (subj. red.)

  - Multiparty Types (trace equivalence).

  - Zooid: An executable process language (certified type checking).

- Tools we used:

  - The Coq proof assistant.

  - Locally Nameless (LN) binders.

  - Ssreflect to structure proofs.

  - Parametrised Coinduction (PACO) to do coinduction.

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...alk about:

..., binary session

... for LN with
...es.

...rtified process DSL.

...t certifies Zooid.

We prepared 'smol'
versions of the systems.

Offline Material Available

Code to fiddle with (and maybe even contribute).

- Repository for the reduced systems:

  - http://github.com/emtst/gentleAdventure

Outline

For real this time.

- David with an introduction to Ssreflect.

- Francisco will present a smol-EMTST.

- David will talk about smol-Zooid, a DSL for multiparty processes.

- Lorenzo will present the proof that makes smol-Zooid a certified DSL.

- If there is time, we want to say something about some ideas for the future.

Introduction to Ssreflect