Digital Identity in the Age of Organic Machines

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1.0

Inorganic machines are machines characterized by repetition or near-repetition, whose future state can be predicted with enough observations.

organic machines

Organic machines are complex folds of hardware, software, model, and data connected through *procrastinated and temporary binding* in run-time that reveal something not given within them, something new, emergence.

The **intelligence of organic machine**, then, is always emergent as it is one of its modes of actualization, the potentiality of infrastructural configurations.
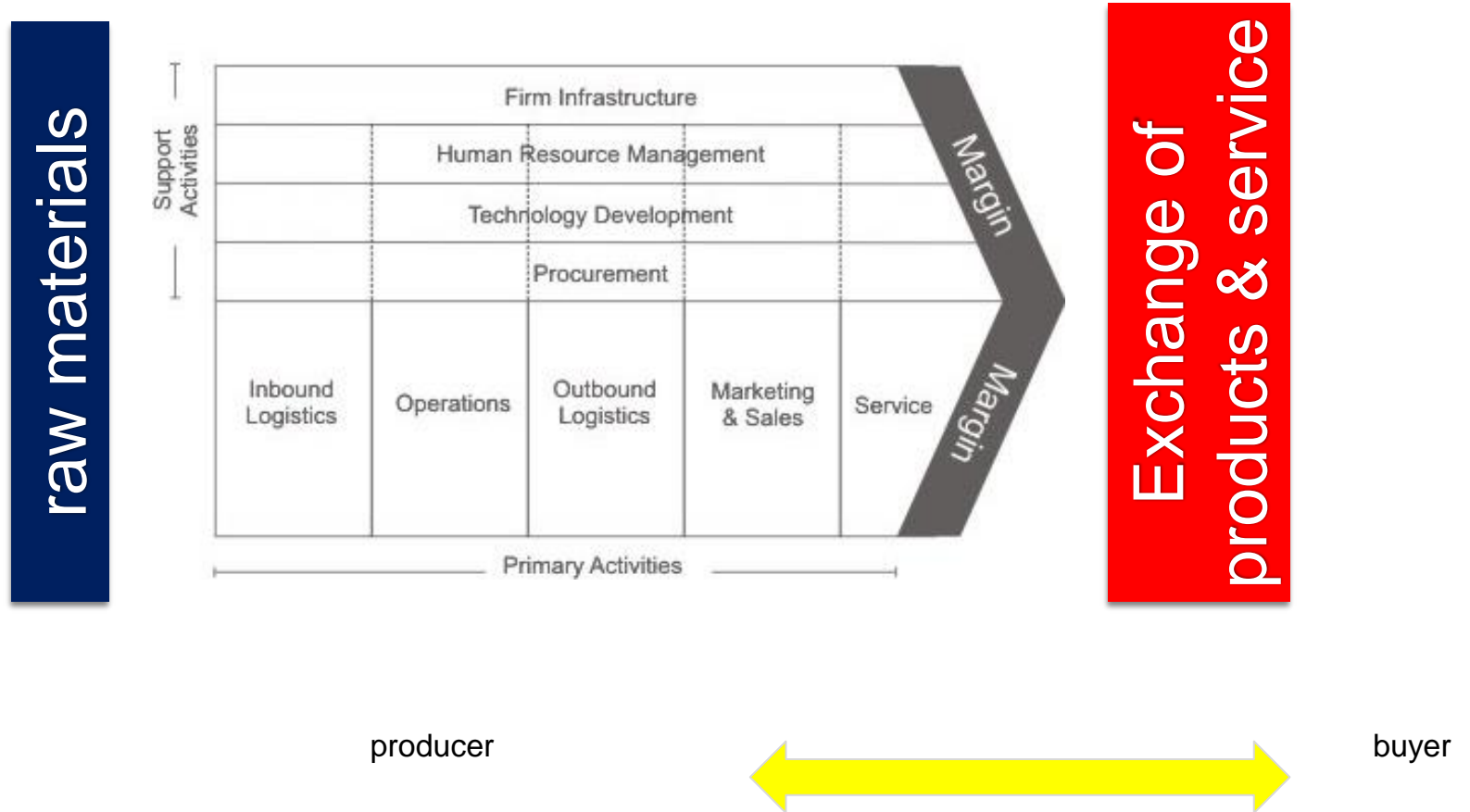
The emergent intelligence of organic machines is an outcome of the individuation process **from singularity to multiplicity**.

2.0

Industrial value creation process

raw materials

Exchange of products & service

producer ⟷ buyer

permanent and **early** **binding** of form and function

the process of value creation process is to produce **goods** with **irrevocable status** through **irreversible value creation process**

An algorithmic firm performing non-linear value creation process using organic machines

back stage

sensing

embedded computing assets

predictive & prescriptive analytics

time

things

computed user experience

people

front stage

ubiquitous computing assets

space

shaping

algorithmic services

biosphere

infosphere
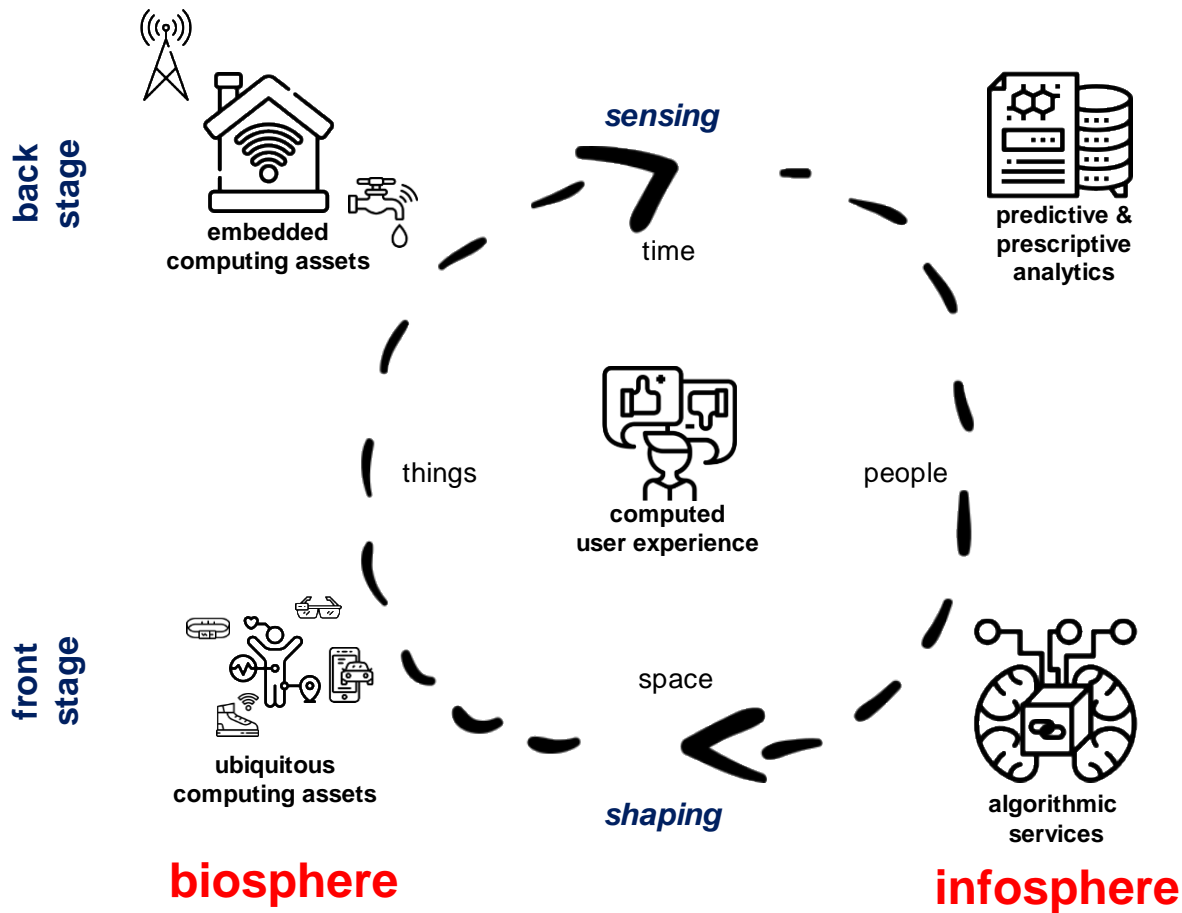
Value co-creation in a Digital Value Loop

on-demand, deferred, temporary, and recombinant configuration of distributed material and non-material resources through the "live actions" of software-enabled algorithmic instructions

procrastinated and temporary binding of resources at or near the point of use through reversible recombinant processes

a **product** as a **computational performative enactment** of socio-technical assemblage of heterogeneous resources and activities <u>**at or near the point of use**</u>

A future firm is **a nexus of organic machines** that transform (*perishable) insights* into value in temporally and situationally meaningful way

A future firm creates value by creating **a new space of possibilities**

3.0

Privacy (along with Equity and Sustainability) is one of the major sources of **market failures**

The current paradigm of digital infrastructure is not designed this level of granular and multi-dimensional data and our ability to dynamically infer individuals' status

Covid-19 risk management is an acute manifestation of this potential chronic condition.

Privacy-preserving Edge Analytics for Digital Twins

1st Generation:
Server-based anonymous architecture
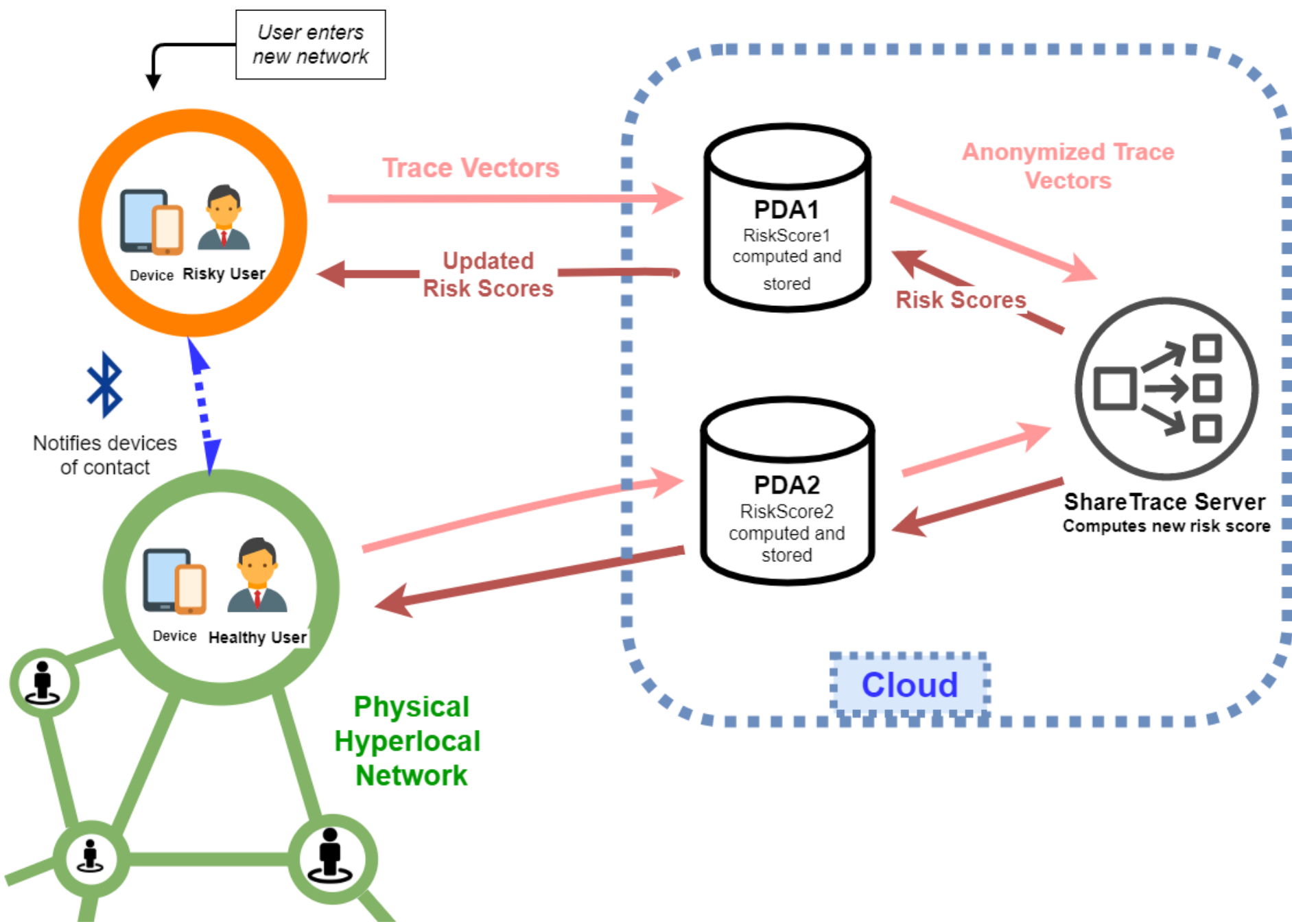
2nd Generation:
Serverless non-anonymous architecture

Q&A

ShareTrace Framework: What and Why

- WHAT: ShareTrace uses Personal Data Accounts (PDAs) to build anonymized hyperlocal networks of digital twins of individuals to perform Covid-19 risk propagation in local communities.
  - PDAs are owned legally and functionally by individual users, just as they own their devices.
  - Any sharing of computed scores from PDA will be controlled by users through contracts.
- WHY:
  - Effectiveness: Using a novel risk propagation algorithm on anonymized hyperlocal graphs, ShareTrace is shown to be significantly more effective for controlling the spread of COVID-19 compared to traditional contact-tracing approaches (see Appendix B)
  - Privacy: Using PDAs as anonymized digital twins of users, ShareTrace provides comparable privacy guarantees with respect to other traditional contact-tracing approaches

Comparison (under strict social distancing)
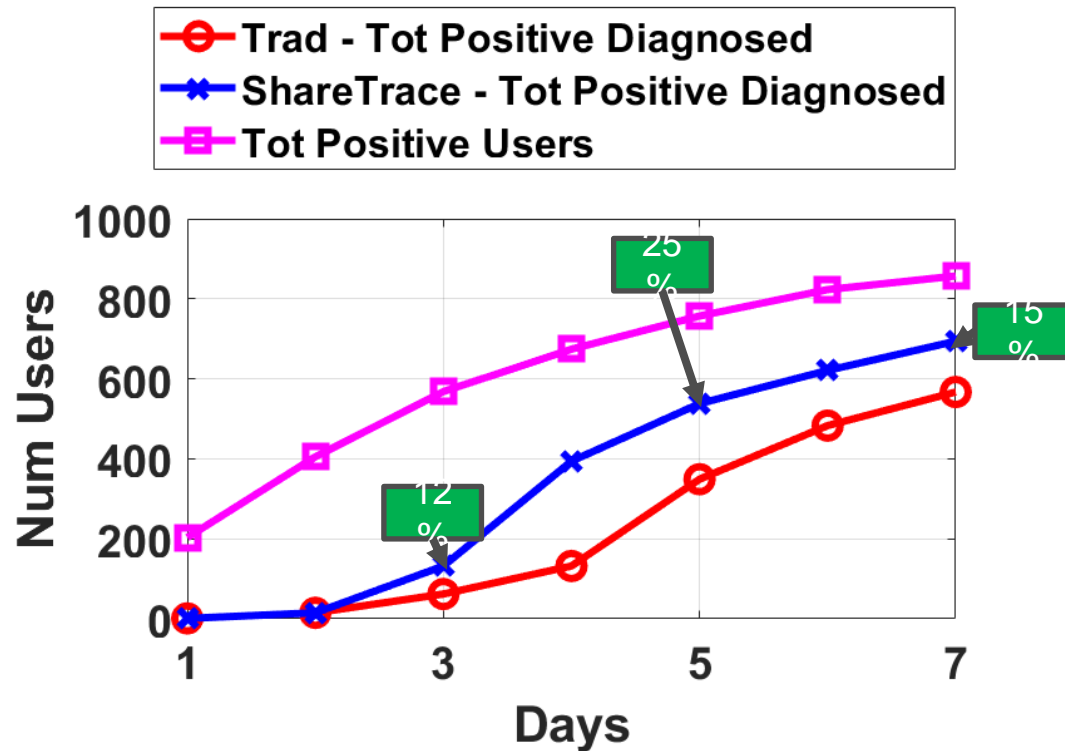
Comparison (relaxed social distancing)