

Estonia's digital revolution

Or how to digitise a country

T.H. Ilves 17 September 2020

The Estonian e-Governance System

- Built on existing standards
- Open source, non-proprietary software
- Strong Private sector participation and investment
- Infrastructure set up in 2001
- All new services rely on this infrastructure
- Thus easy to set up

What you *need* for effective e-governance in four bullet points

- **A Strong, Secure, Identity with Legal efficacy with wide use to guarantee:**
- **Digital Services that people and businesses, not just the Ministry of Finance bureaucrats want**
- **A secure architecture for citizen and private sector services, preferably with a distributed exchange layer**
- **You need to guarantee data integrity**

The fundamental issue:



"On the Internet, nobody knows you're a dog."

2001 Rollout of Digital Identity card



A digital Identity needs

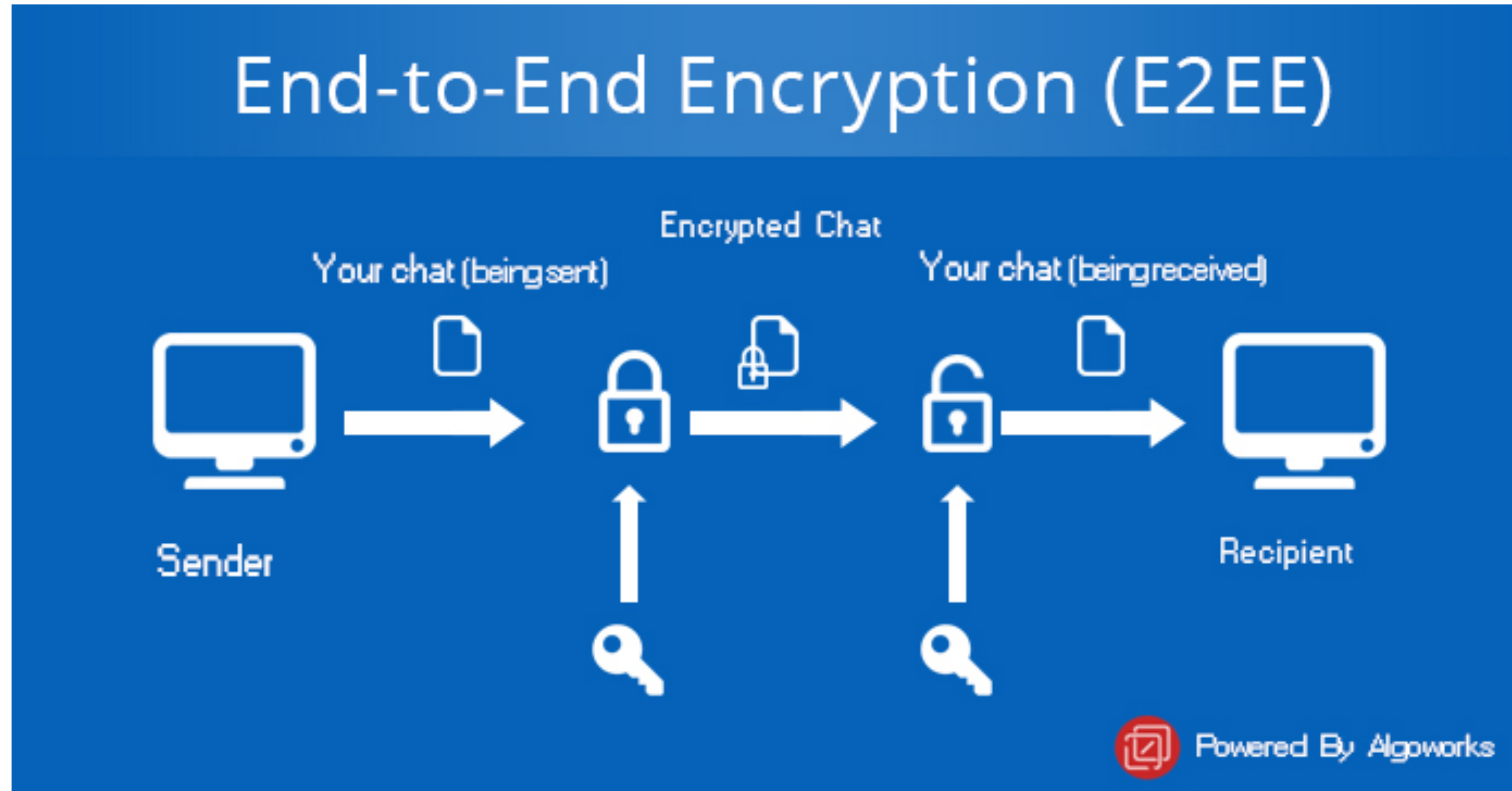
- **To be secure and unique, i.e. belonging only to you**
- **Legal efficacy (Digital signature law)**
- **Use at least Two Factor Authentication**
- **Use End-to-End Encryption.**
- **Wide-spread if not mandatory distribution (but not mandatory use)**

2001 Rollout of Digital Identity card



End-to-End Encryption (E2EE)

Based on the chip in the ID or mobile SIM card



Two-factor authentication (2fa)

Two factor authentication



Something
you know

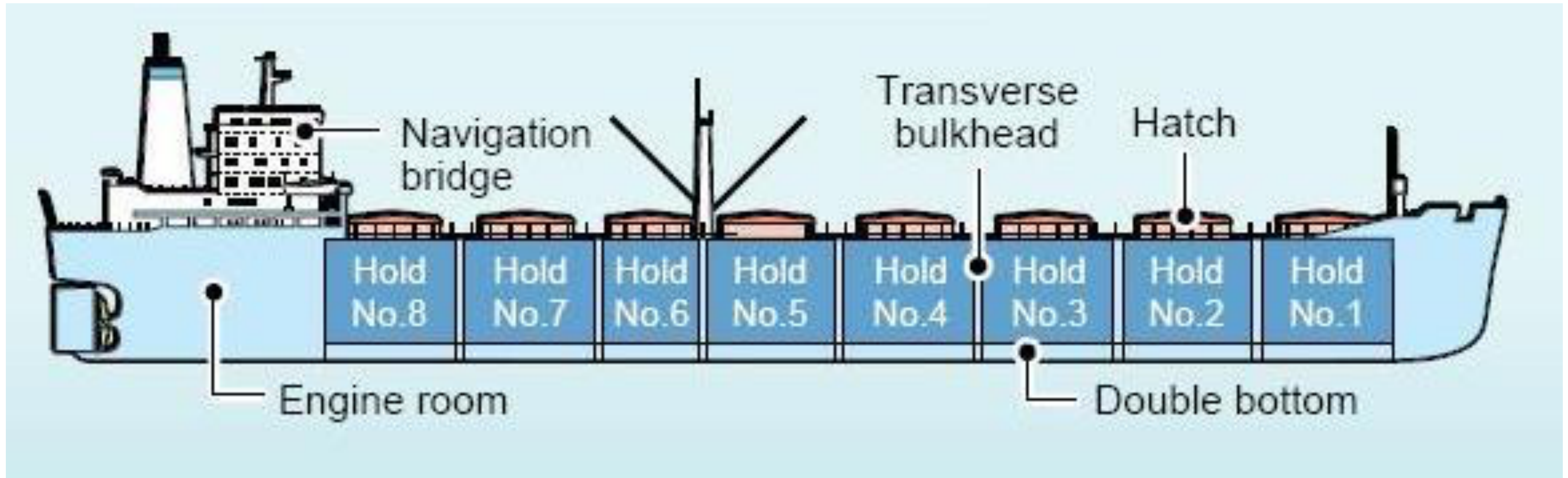


Something
you have

How to access services securely with a secure ID

- **The Architecture must be secure**
- **Estonia chose a distributed data exchange layer. We call it the X-Road.**
- **No Central Data Base**
- **You can only access data by verifying yourself with 2FA**

Think of a modern ship with separate holds



Privacy vs. Integrity

- ***Privacy*** is to ensure others do not see or *copy* my data
- ***Integrity*** is to ensure your data is not changed by others

The *Once Only* rule

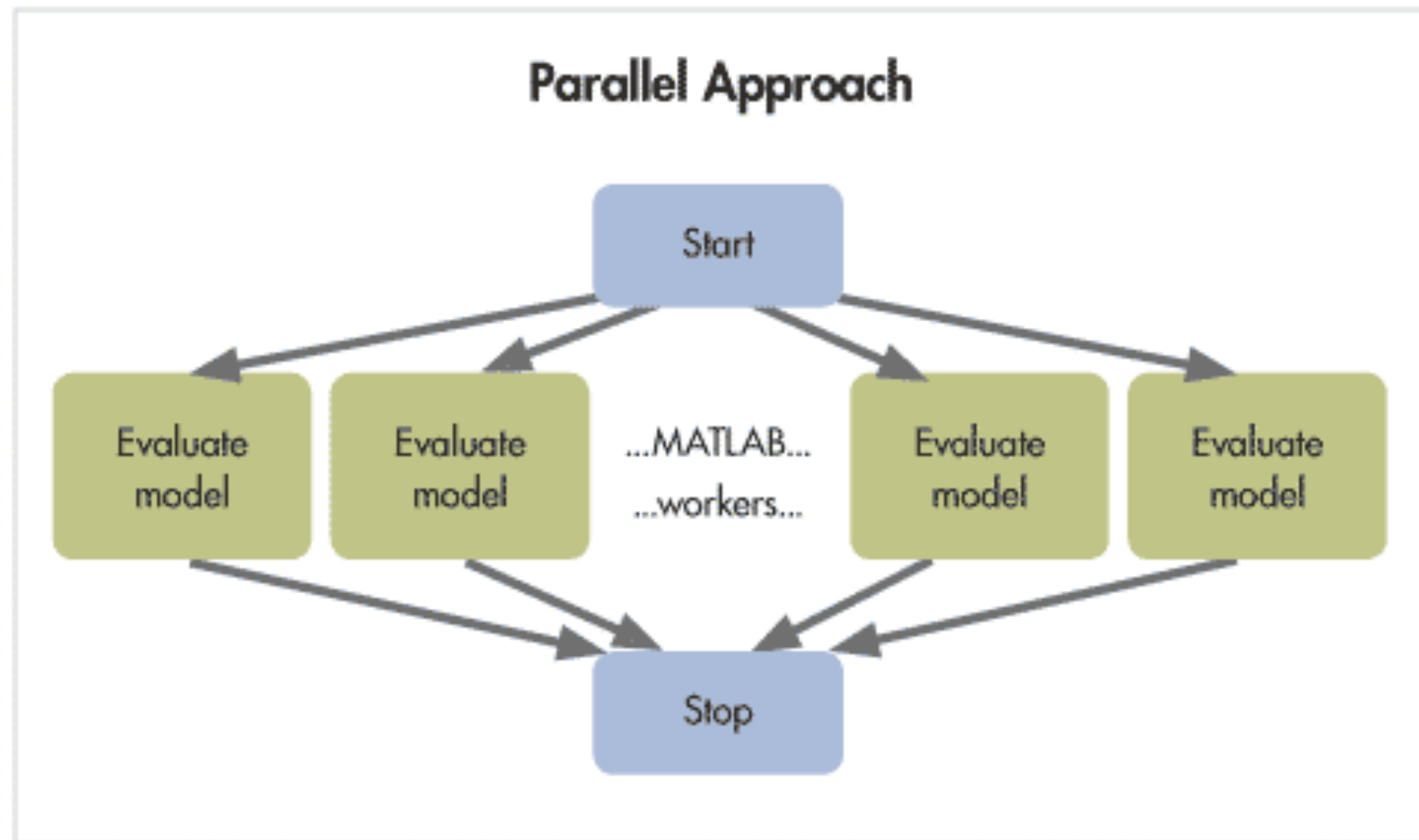
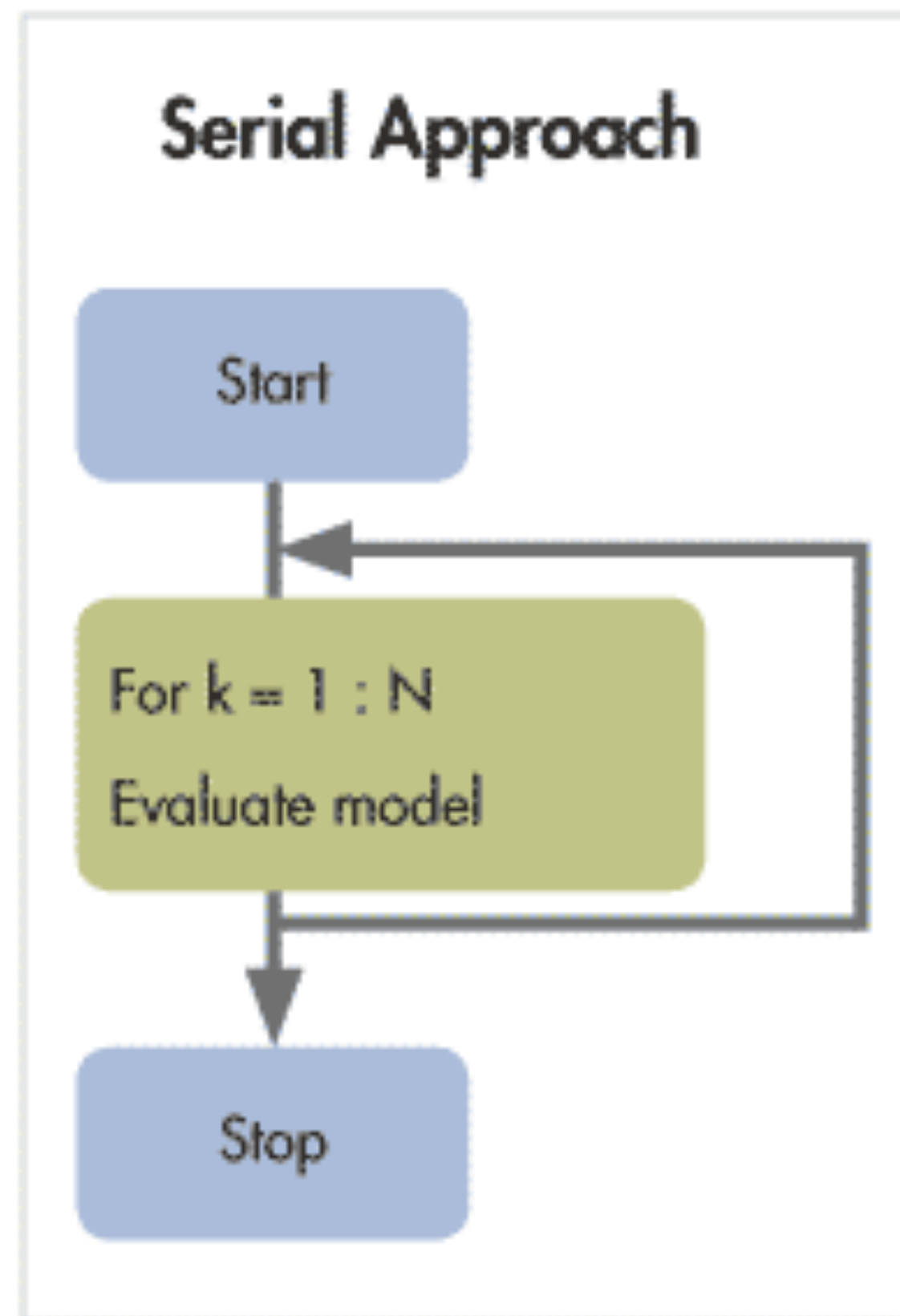
- You never have to add information the system already has
- No addresses, phone numbers or any other information already existing
- Your digital identity allows you to access anything you are entitled to access.

Bureaucracy in Imperial China.

Which remains the standard model *to this day*



A Revolution in bureaucracy: Sequential vs Parallel processing



Economic benefits.

- Dramatic increase in digital private sector
- We save about 2% GDP in saved time, both by the supply side (public services) as well as the demand side (citizens time)
- 0.3% of the population produces 7% of GDP
- Digitization has produced 4 unicorns, roughly 1 per 350,000 people
- E-residency: > 60,000 companies established, ca. 60 M€ in tax revenues
- Virtual circle: successful companies —> more students study STEM —> more people enter the digital economy
- Corruption reduction.