

A distributed personal medical system

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- **Distributed**
- **Abstract formulation = requirements + design**
- **Privacy, ethics, security**
- **Data analytics**

Med

$his : \text{seq } MedCon$
 $cur : \mathbb{P} CurMed$
 $con : \mathbb{P} All$
 $med : \mathbb{P} MedCond$
 $vac : \mathbb{P} Vac$

Per

$fin : FIN$
 $pi : PI$
 $sus : \mathbb{P} All$

State

$d : ID \rightarrow Med$
 $e : ID \rightarrow Per$
 $f : ID \rightarrow \mathbb{B}$

$\forall i : ID \bullet d(i).cur, d(i).con, d(i).med, d(i).vac \in d(i).his$

$\forall i : ID \bullet f(i) = 0 \Rightarrow d(i).cur = d(i).con = d(i).med = \{ \} = e(i).fin$

$$\text{valid}(a, \text{pat}, \text{sign}) := \left(\begin{array}{l} a \in \text{ApprovedList} \\ \text{pub}_a(\text{sign}) = \text{pat} \end{array} \right)$$

ShallowRead

\exists *State*

acc?, *i?* : *ID*

sign? : *SIGN*

info! : $\mathbb{P} \text{Vac} \times \mathbb{P} \text{All} \times \text{Per}$

valid(*acc?*, *i?*, *sign?*)

info! = (*d*(*i?*).*vac*, *d*(*i?*).*con*, *e*(*i?*))

MedUpdate

$\Delta State$

$doc?, i? : ID$

$sign? : SIGN$

$p? : Med$

$valid(doc?, i?, sign?)$

$d' = d \oplus \{i? \mapsto p?\}$

$e' = e$

$f' = f$

PatUpdate

$\Delta State$

$a?, i? : ID$

$sign? : SIGN$

$p? : Per$

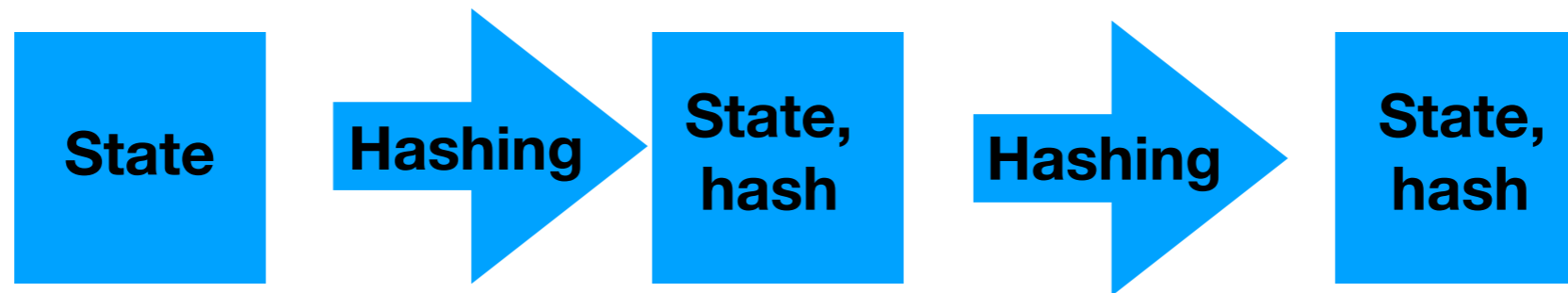
$valid(a?, i?, sign?)$

$e' = e \oplus \{i? \mapsto p?\}$

$d' = d$

$f' = f$

MediChain



- Design inspired by blockchain