

SSI And Biometrics

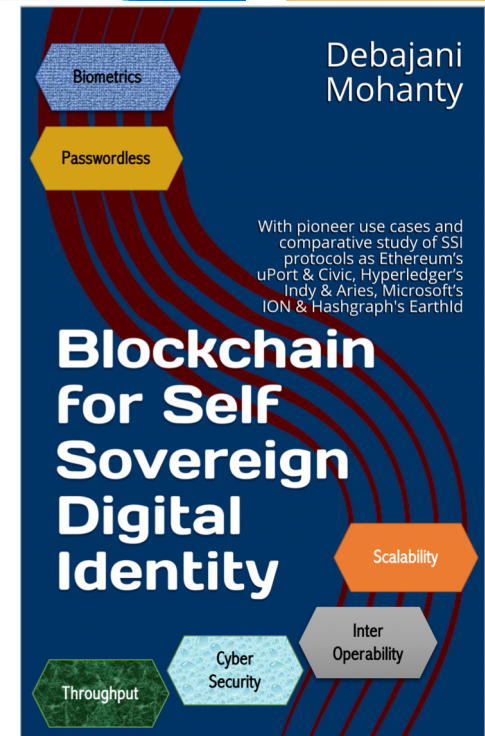
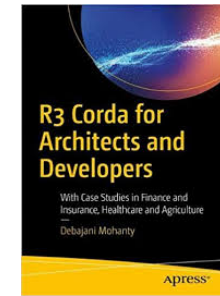
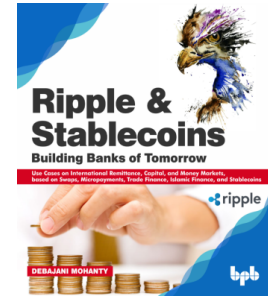
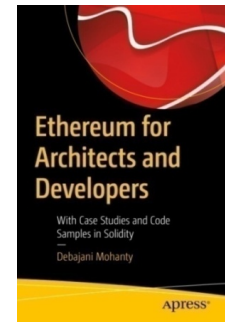
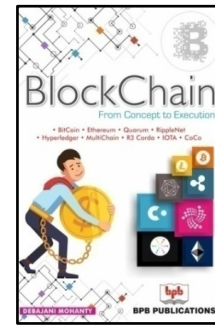
Building Identities for Tomorrow



Debajani Mohanty

Who am I?

- Two decades of experience in industry involving large scalable projects across verticals.
- Blockchain Solution Architect implementing 8 pioneer projects on Blockchain globally.
- Author of Amazon bestseller “**BlockChain From Concept to Execution**”, “**Ethereum for Architects and Developers**”, “**R3 Corda for Architects and Developers**”, “**Ripple and Stablecoins: Building Banks of Tomorrow**”
- Author of “**Blockchain for Self Sovereign Digital Identity**”
- Keynote speaker at many national and International events, Mentor, Practitioner
- Working with **EarthId** to build Nextgen Decentralized Identity Solution with advanced Biometrics



Agenda

- Importance of Biometrics in Authentication

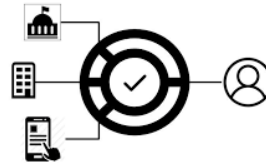


- Types of Biometrics with Pros & Cons



- Issues in Biometrics Solutions

- Introduction to SSI



- EarthId Solution



- Use Cases



- Questions & Answers



Why Biometrics for Authentication?



UserId & Passwords Vs. Biometrics



User Ids & Passwords are hassles

Biometrics are for ever

Most passwords are easy to guess

Biometrics can't be guessed

Resetting Needs maintenance

No need for resetting

UserId (Mobile#, EmailId etc.) can change

Most biometrics do not change the pattern for a long period

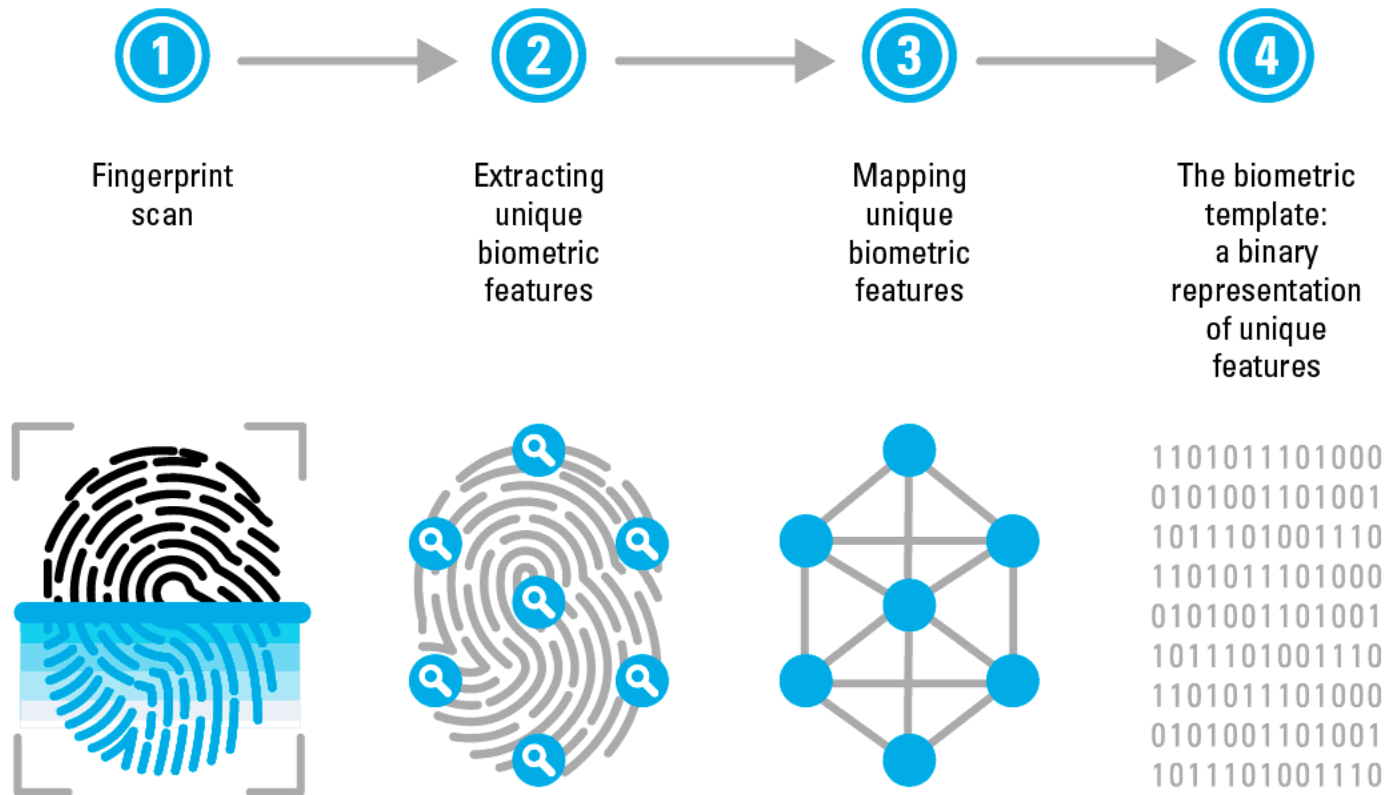
Can be stolen by hackers through social engineering techniques

Difficult and expensive to steal and reuse

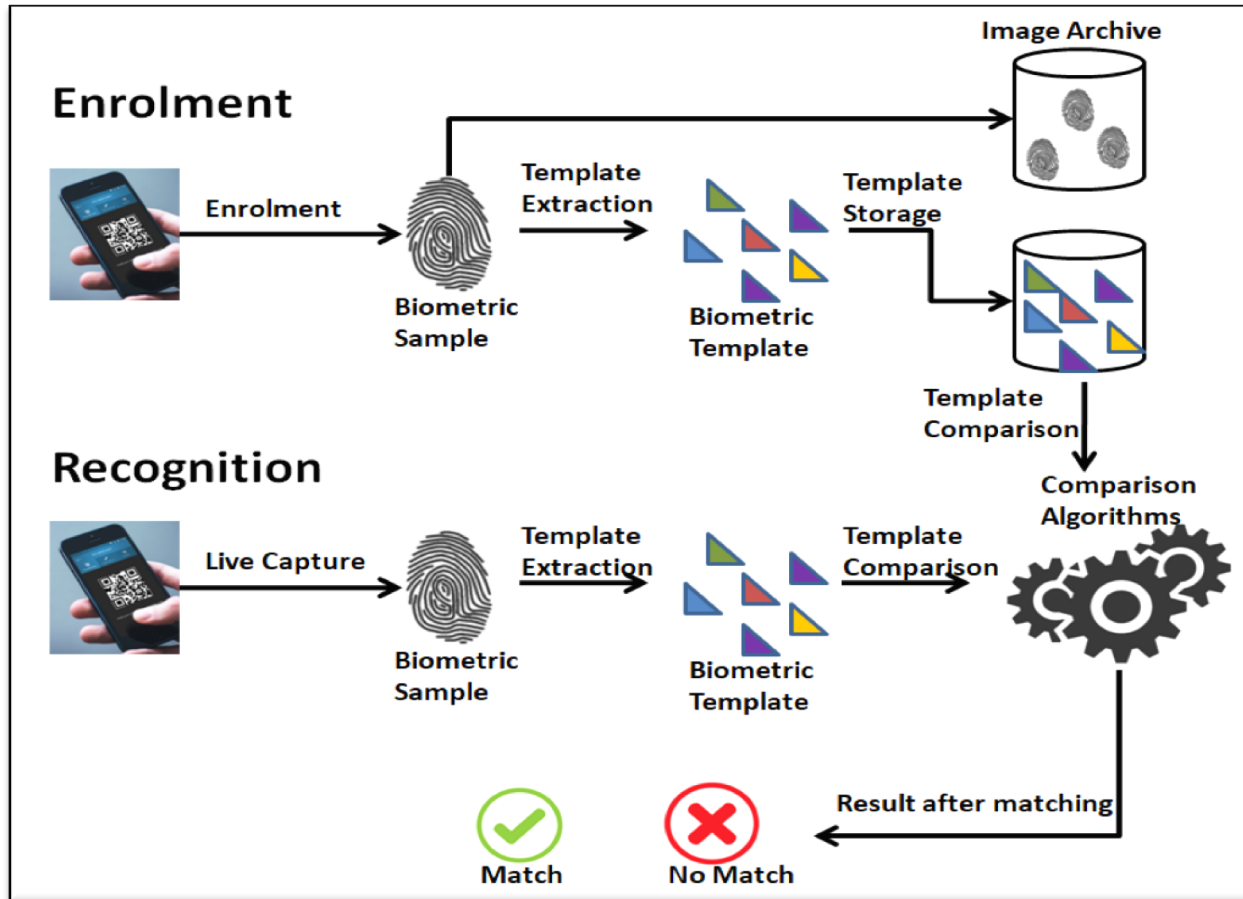
Often same UserIds are used leading to co-relation

Co-relation is not easy and very difficult to counterfeit

How Biometrics Works



How Biometrics Works



Biometric effectiveness

- False Acceptance Rate
- False Rejection Rate

Issues in Biometrics Solutions

- Vulnerable to data breach



- Disqualification for Injuries



- FAR & FRR



- Discomfort



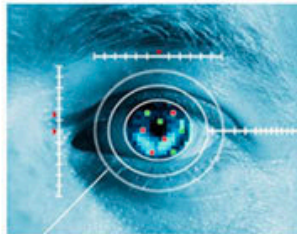
- Expensive



Types of Biometrics

Physiological

Behavioral



Iris



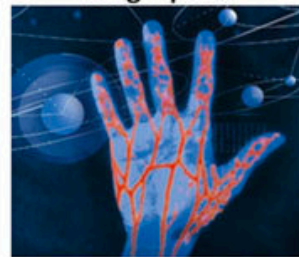
Fingerprint



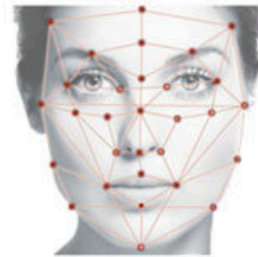
Ear



DNA



Vein print



Face



Voice



Gait



Signature

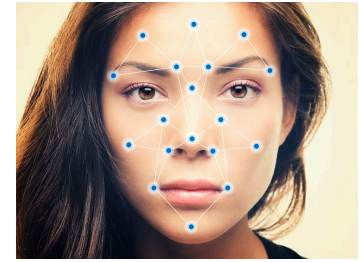
- ✓ Security
- ✓ Accuracy
- ✓ Privacy
- ✓ Ease of Use
- ✓ Health & Hygiene
- ✓ Cost Effective
- ✓ Exclusions

Fingerprint



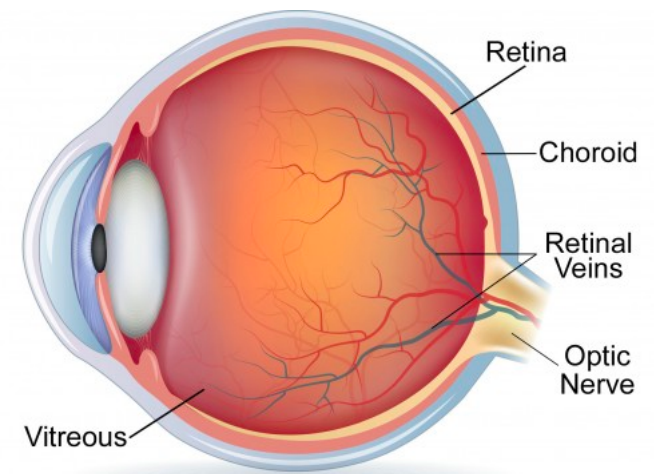
Pros	Cons
➤ Security	➤ Privacy
➤ Ease of use	➤ Health & Hygiene
➤ Cost effective	➤ Exclusions
	➤ Accuracy

Facial Recognition



Pros	Cons
➤ Health & Hygiene	➤ Privacy
➤ Ease of Use	➤ Accuracy
➤ Cost Effective	➤ Security
➤ Exclusion	

Retina



Pros	Cons
➤ Security	➤ Ease of Use
➤ Accuracy	➤ Health & Hygiene
➤ Privacy	➤ Exclusion
	➤ Cost Effective

Iris



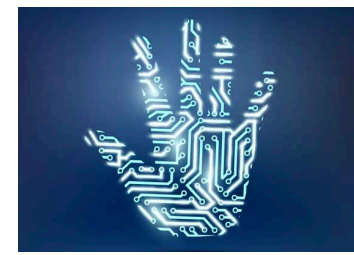
Pros

- Accuracy
- Privacy
- Health & Hygiene
- Security
- Cost Effective
- Exclusion

Cons

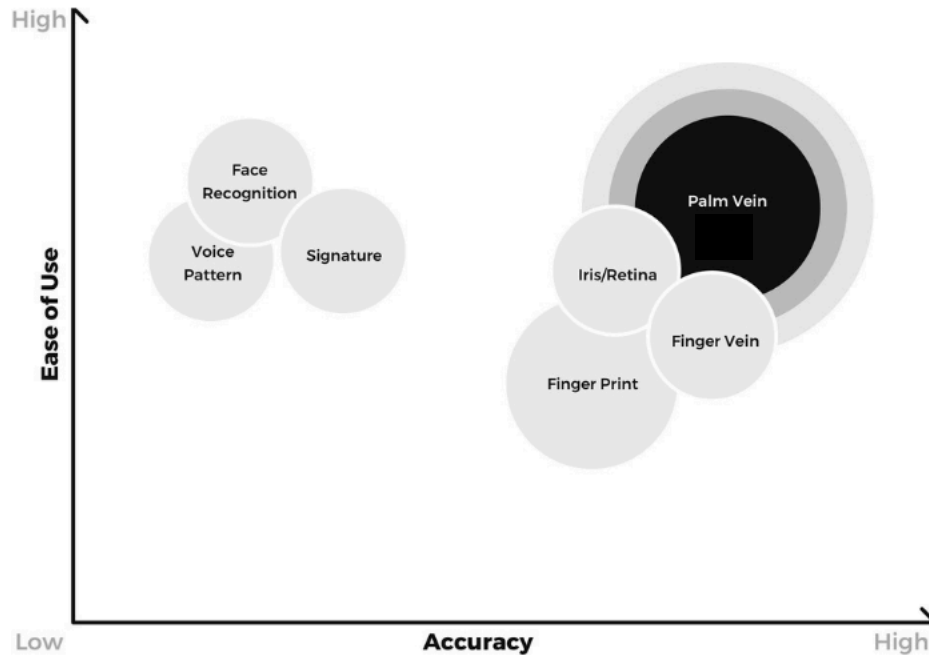
- Ease of Use

Palm Vein



Pros	Cons
<ul style="list-style-type: none">➤ Security➤ Accuracy➤ Privacy➤ Health & Hygiene➤ Exclusion➤ Ease of Use	<ul style="list-style-type: none">➤ Cost Effective

Comparison of FAR/FRR & Comfort Level



False Acceptance Rate (FAR) and False Rejection Rate Comparison

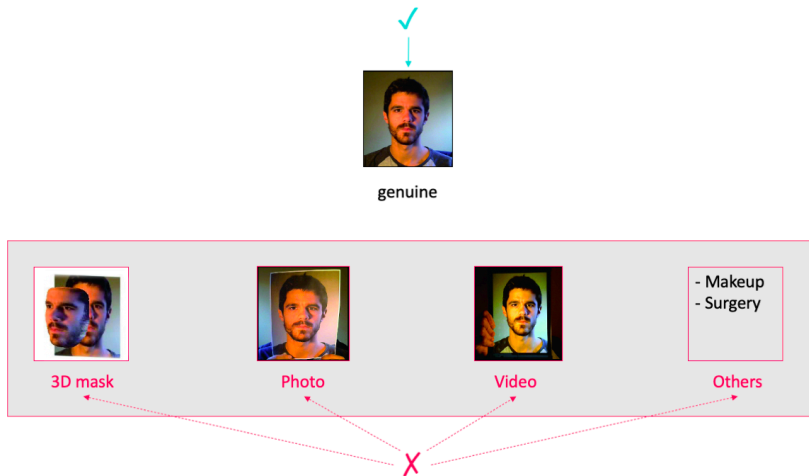
Autentification Method	FAR (%)	if FRR (%)
Face Recognition	~ 1.3	~ 2.6
Voice Pattern	~ 0.01	~ 0.3
Fingerprint	~ 0.001	~ 0.1
Finger Vein	~ 0.0001	~ 0.01
Iris/Retina	~ 0.0001	~ 0.01
Palm Vein	< 0.00001	~ 0.01

Bio feature	Security level	Accuracy	Efficiency
Iris	High	High	Average
Finger print	Average	Average	Average
Face	Low	Low	Average
Hand geometry	Average	Average	Average
Voice	Low	Low	Average
Finger vein	High	High	High

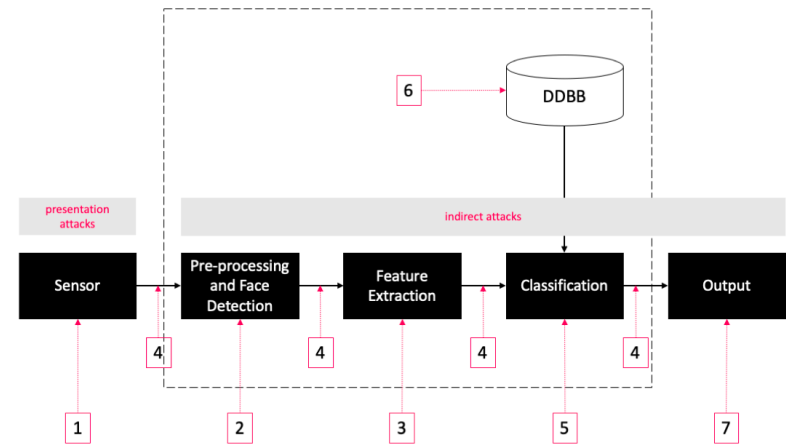
	General Comfort with Biometric Types			
	Very comfortable	Somewhat comfortable	Not very comfortable	Not at all comfortable at all
Eye recognition	34.30%	36.91%	19.56%	9.23%
Fingerprint scan	57.72%	28.36%	9.02%	4.91%
Voice recognition	36.47%	37.68%	17.64%	8.22%
Signature dynamics	38.68%	36.27%	17.94%	7.11%
Typing dynamics	36.07%	35.07%	20.24%	8.62%
Facial recognition	32.83%	36.75%	20.18%	10.24%
Hand geometry	40.42%	36.91%	16.95%	5.72%

Spoofing

Presentation Attack (1)



Indirect Attack(2-7)

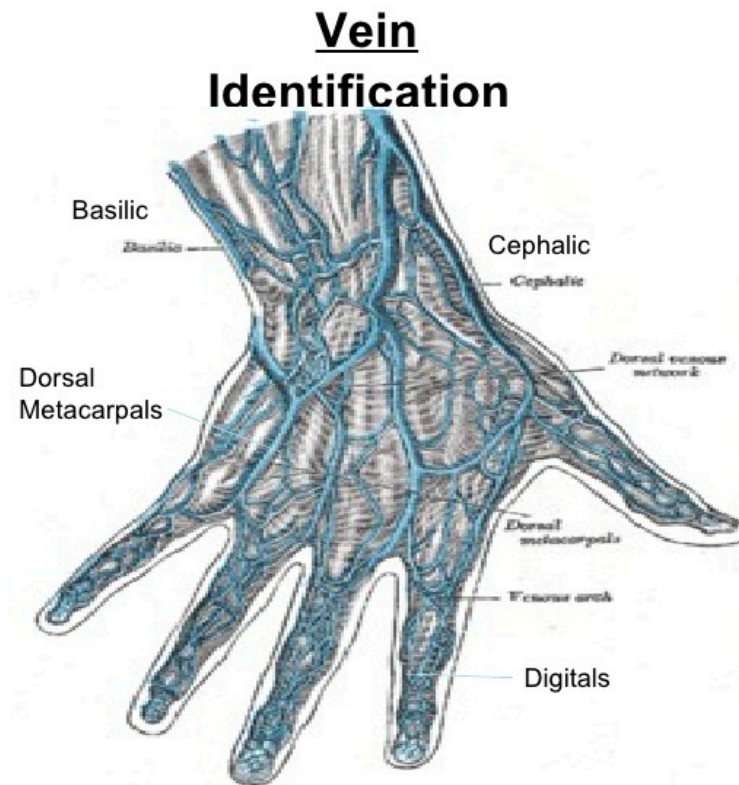


Anti Spoofing Techniques

- **Challenge-response method/Liveness Detection Test**
 - Smiles
 - Facial expressions of sadness or happiness
 - Head movements
- **Sensors & Dedicated hardware**
- **Algorithms**



Liveness Detection Test Not Needed in Palm Vein

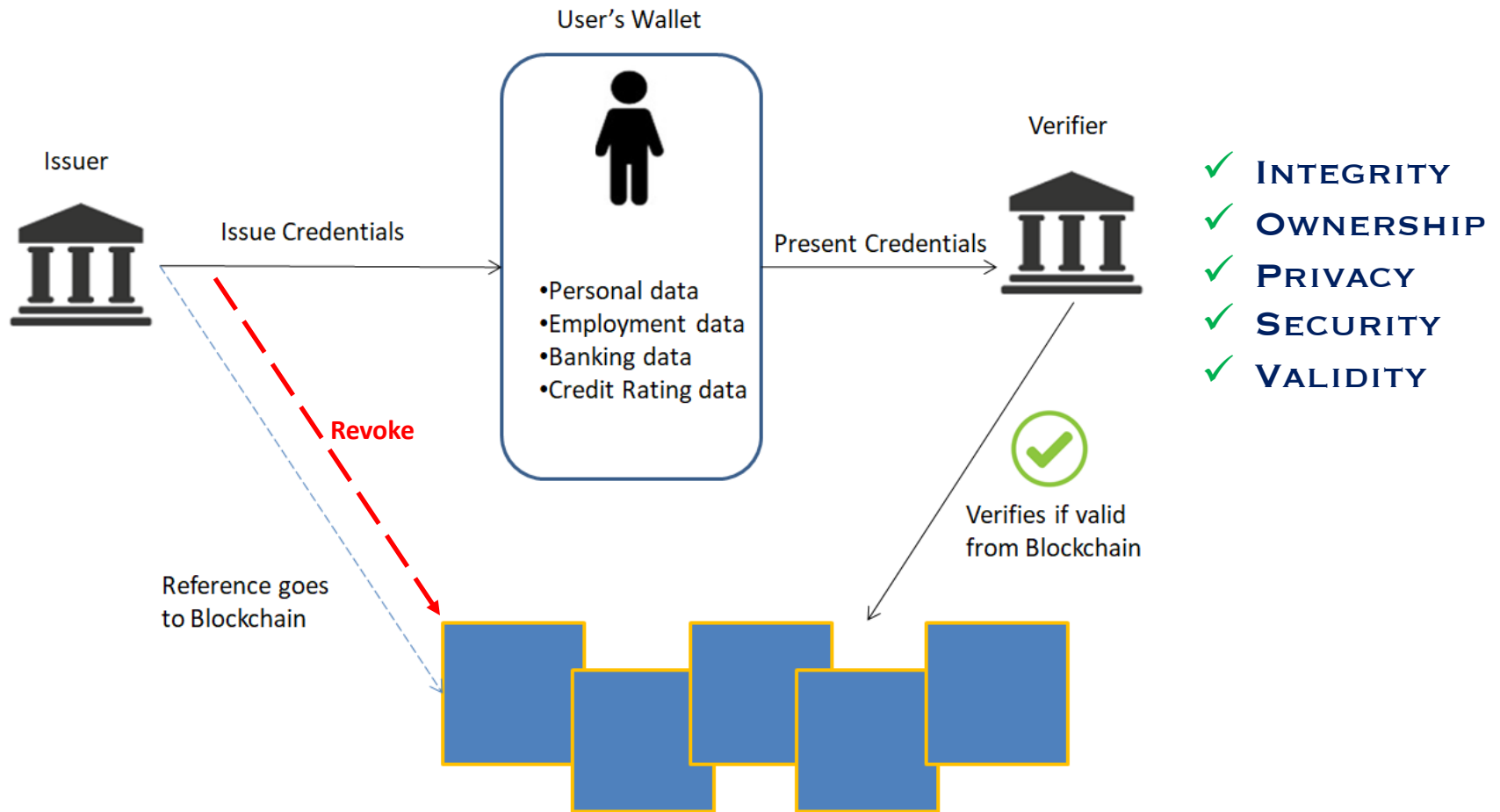


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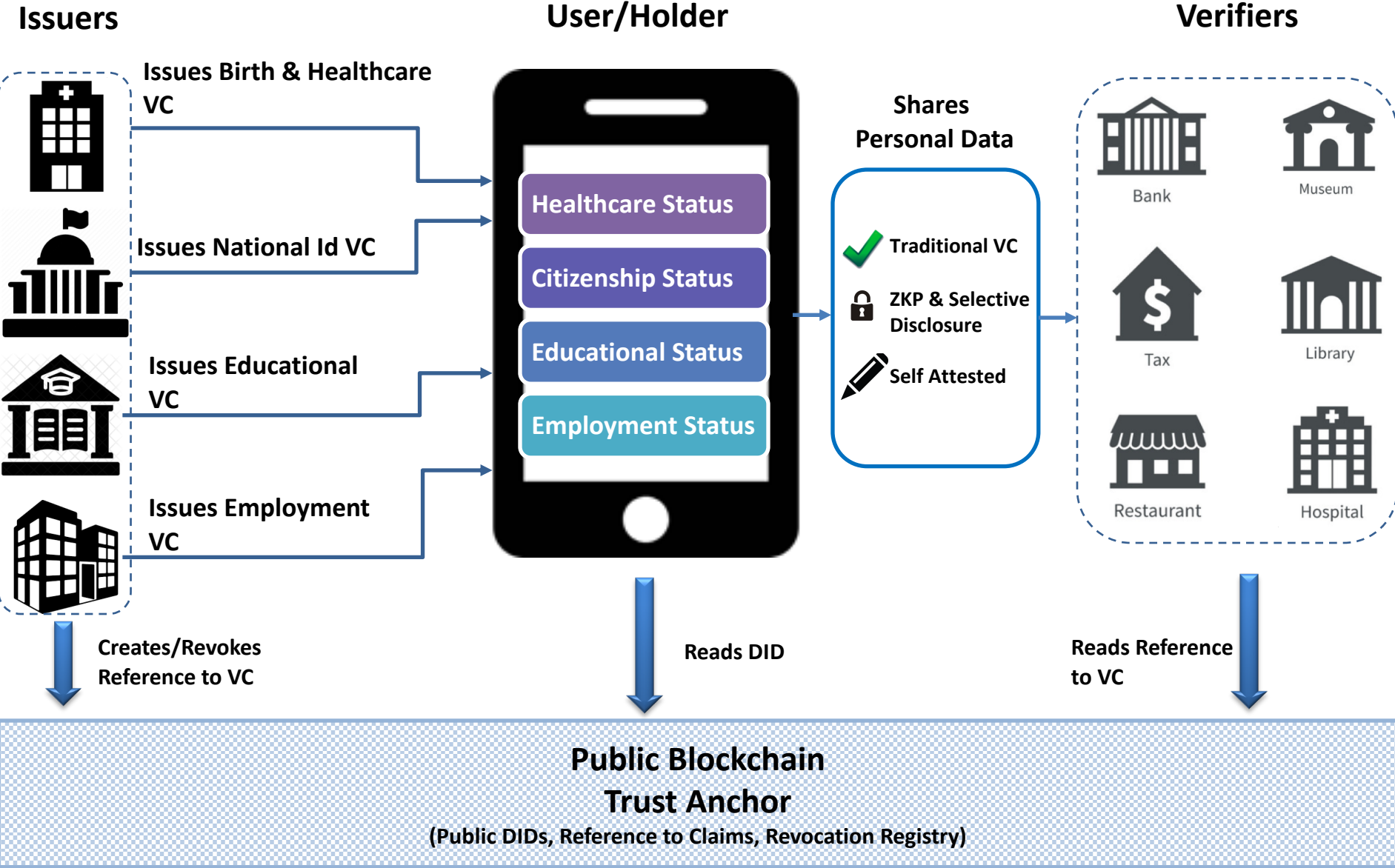
Introduction To SSI



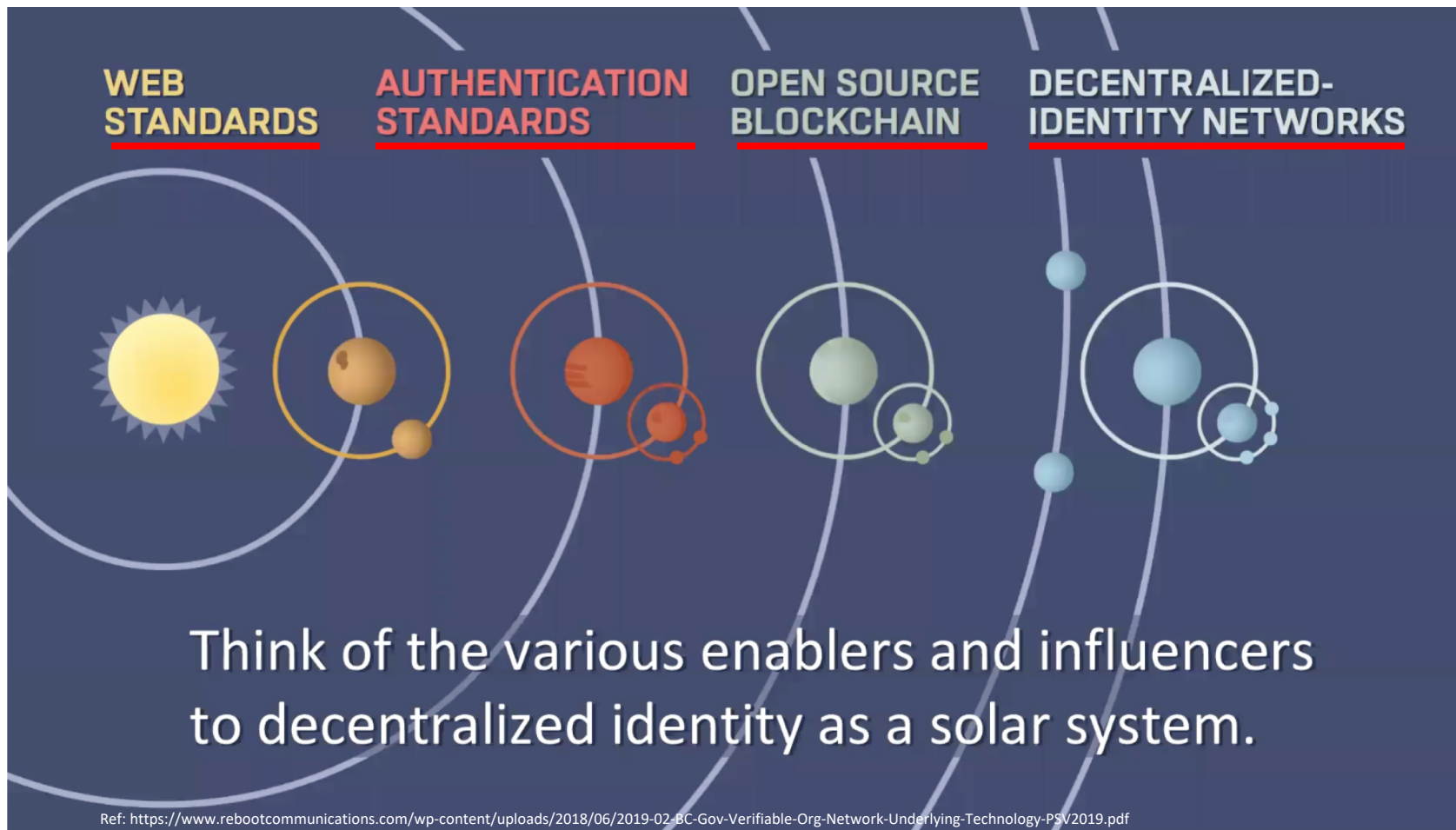
Self Sovereign Digital Identity



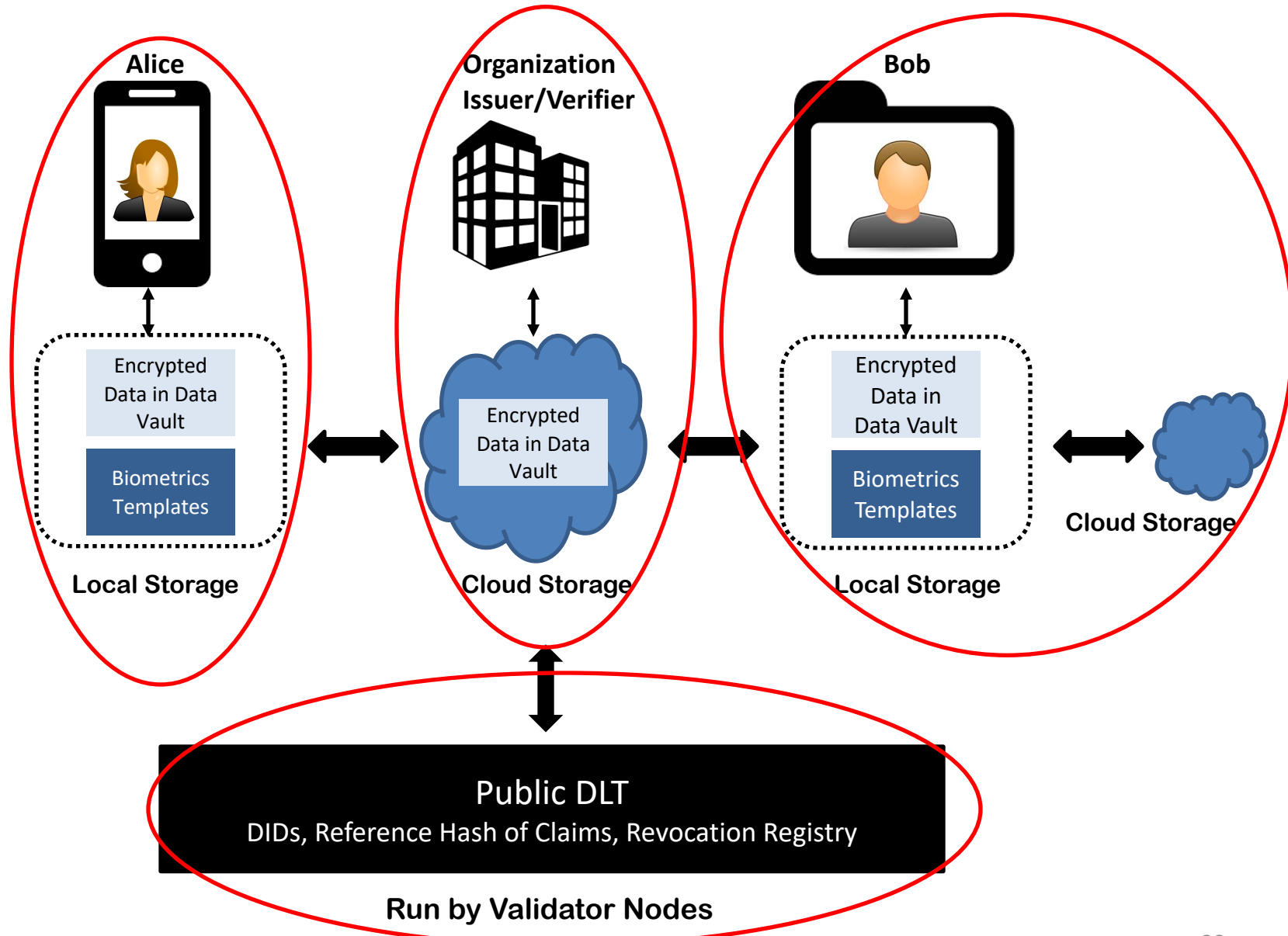
SSI in Real Life



Complexity of SSI Network



System Architecture

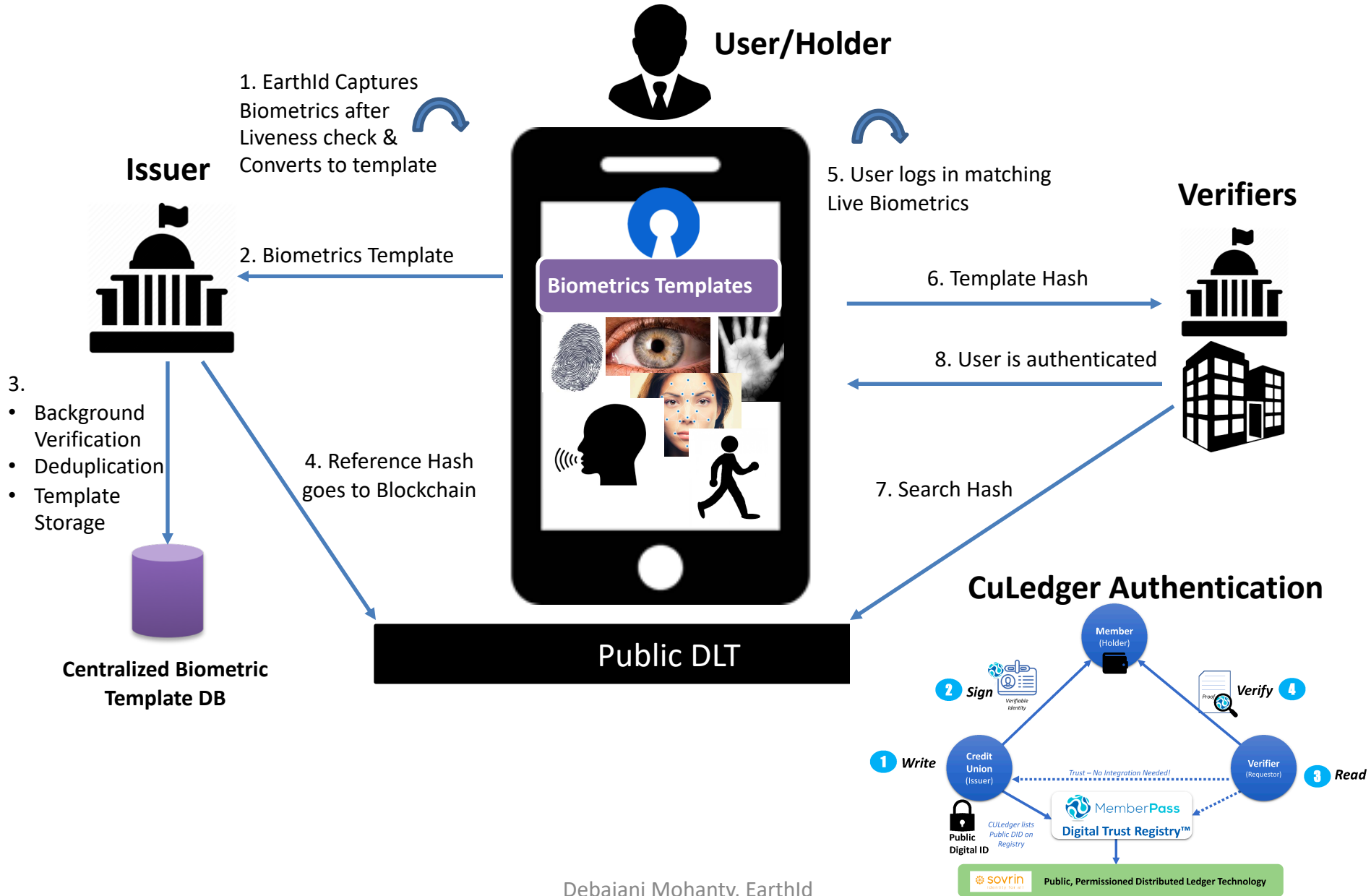




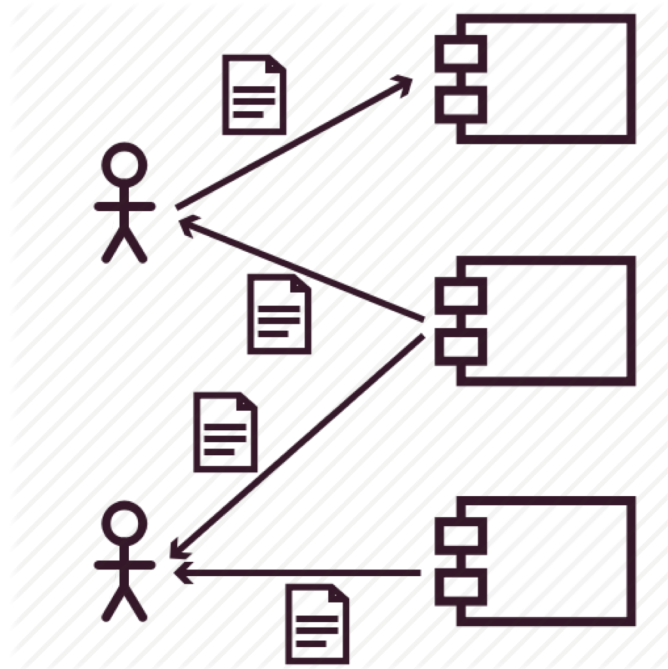
EarthId's Next Gen Authentication With Decentralized Biometrics



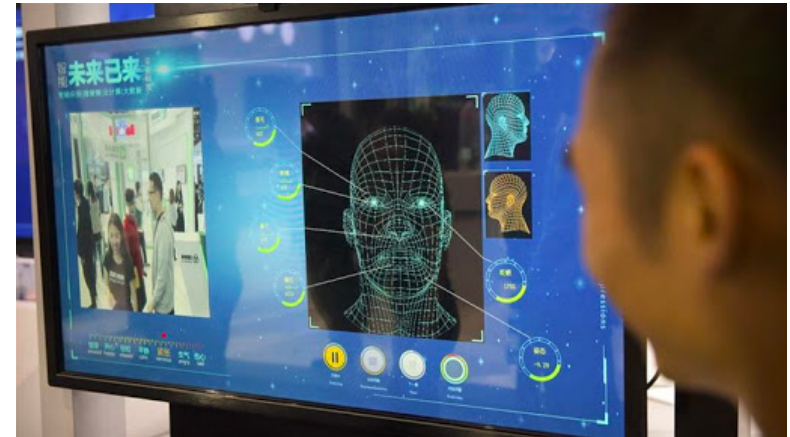
Next-Gen Authentication With Decentralized Biometrics



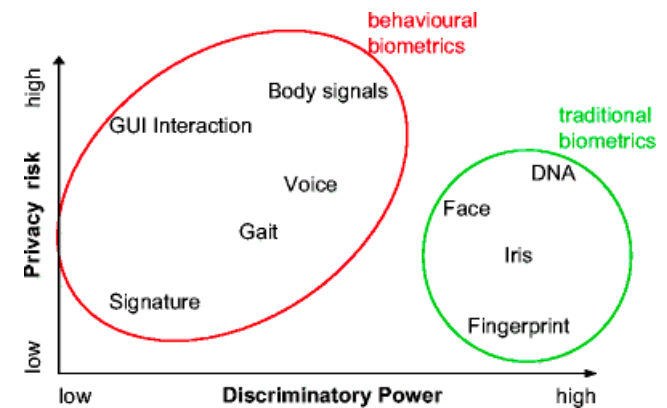
Live Use Cases



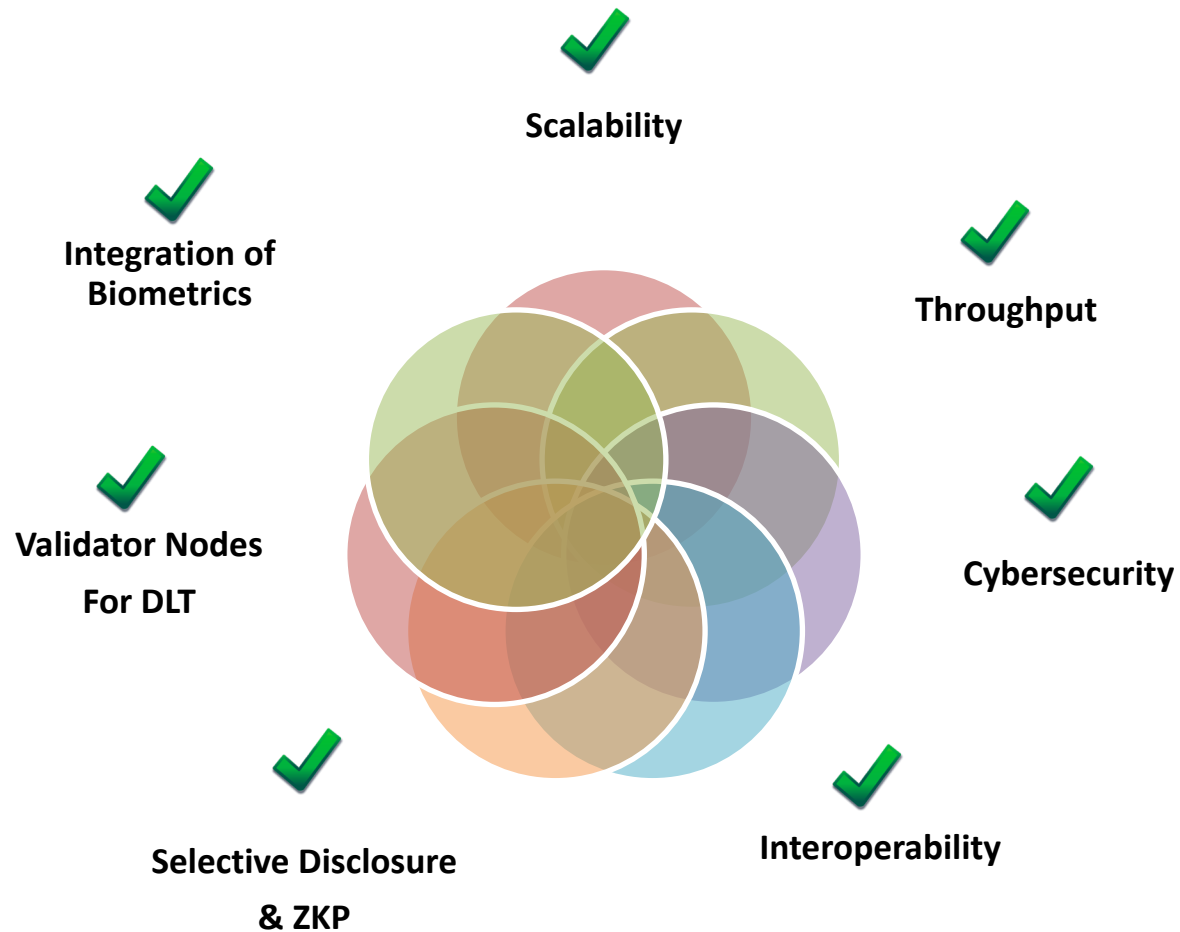
Use Case: Airports of Tomorrow With Facial/Behavioral Biometrics



- No more kiosks
- No more Queues
- Automation of Check-in & Boarding



SSI Success Factors



Thank You & Questions

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