Use of Blockchain in Healthcare and Research Workshop

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Use of Blockchain in Healthcare and Research Workshop

National Institute of Standards and Technology (NIST) Headquarters

100 Bureau Dr. Building 101 Gaithersburg, Maryland

September 26-27, 2016

Master of Ceremonies: Eric Larson

Day 1: Monday, September 26th

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Time (EST)	Description
9:00-9:05	**Welcome, *Eric Larson***
9:05-9:15	**Opening Remarks, *Steve Posnack, ONC*** *Contact Steve: Steven.Posnack@hhs.gov*

Day 2: Tuesday, September 27th

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Time (EST)	Description
9:00-9:05	**Welcome, *Eric Larson***
9:05-9:15	**Opening Remarks, *John Snyder, ONC*** *Contact John: John.Snyder2@hhs.gov*

9:15-9:45	**White House/OSTP Presentation** **Federal Cybersecurity Research and Development Strategic Plan**, Tim Polk; *NIST detail to the White House* In the context of Administration R&D policies and priorities, we discuss the opportunities and challenges for blockchain technologies to improve security, privacy, accountability. *Contact Tim: William_T_Polk@ostp.eop.gov*
9:45-10:50	**Blockchain Level-Set** ***Program Overview***, *Elaine Barker* (5 min) ***Introduction to Blockchains***, *John Kelsey, NIST* Blockchain technology; what it is, how it works, and what problems it can solve. A brief look into the cryptography used in blockchains, providing a sketch of how they generally work and discuss the kinds of problems they seem useful for solving. The goal is to provide a basic understanding of what a blockchain is for individuals that are new to the technology. *Contact John: john.kelsey@nist.gov* --- ***NIST Cryptography Standards for Blockchain Applications,*** *Lily Chen; NIST* This presentation will provide an overview about NIST Cryptography Standards. It focuses on cryptography tools for Blockchain applications. The presentation also explains how NIST standards are developed in case the need for new cryptography techniques for Blockchain appears. *Contact Lily: Lily.chen@nist.gov*
10:50-11:05	**BREAK**

9:15-10:45	**ONC Challenge Presentations** ***Blockchain Technologies: A discussion on how the claims process can be improved,*** *Kyle Culver; Humana* Smart contracts, blockchain and other technologies can be combined into a platform that enables drastic improvements to the claims process and improves the healthcare experience for all stakeholders. *White Paper* *Contact Kyle: kculver@humana.com* --- ***A Blockchain Profile for Medicaid Applicants and Recipients: Conceptual Model for Health Data,*** *Alessandro Voto; Blockchain Futures Lab - Institute for the Future* A solution to the problem churning in the Medicaid program that illustrate how Health IT and health research could leverage blockchain-based innovations and emerging artificial intelligence systems to develop new models of health care delivery *White Paper* *Contact Alex: avoto@iftf.org*
10:45-11:00	**BREAK**

11:05-12:35	**Blockchain Reality Check** ***Evaluating Blockchain and Alternatives,*** *Mance Harmon; Ping Identity* Bitcoin blockchain is used to create open networks of peers, each unknown and untrusted individually, which agree on the order of network transactions. These networks are slow and expensive to operate. Hyper-ledger enables fast, permissioned networks, only allowing trusted peers to join. Swirlds hashgraph unifies the security of open networks and the performance of permissioned networks at very low cost. *Contact Mance: mharmon@pingidentity.com* ***Blockchain's Challenges In Real Life,*** *Stephen Wilson; Constellation Research* Since the emergence of the Internet, nothing has captured the imagination quite like Blockchain. Designed to solve the unsolvable, the Double Spend of electronic cash without a central digital reserve, blockchain has been championed for many other use cases. The native blockchain only resolves the order of entries in a distributed ledger. For other applications, more general Distributed Ledger Technologies require several additional security layers that the original blockchain can disappear. *Contact Stephen: Steve@constellationr.com* ***"Fit for Purpose" Distributed Ledger Technology (DLTs),*** *Drummond Reed; Respect Network* The term "blockchain" has become very generic (and over-hyped). This talk will illustrate how distributed ledger technology (DLT) is as diverse as database technology and must be viewed as only one component of a full market solution that needs to be architected to fit the specific purpose for which it is designed. It will use the Sovrin distributed identity ledger as a concrete example. *Contact Drummond: drummond@respect.network*
12:35-1:35	**LUNCH**
1:35- 3:05	**Identity Innovation Projects (DHS S&T), Panel and Q&A** ***Introductions and Overview,*** *Anil John* (5 min) **DHS Identity Innovation Grants**, *Manu Sporny; Digital Bazaar* (15 minutes) An analysis of the security and performance capabilities of current blockchain technology, what a blockchain specific to identity might look like, the problems we may solve with such a blockchain, and which standardization body could ratify the necessary pieces to bring a low-cost, interoperable solution to market. *Contact Manu: msporny@digitalbazaar.com* ***IoT Device Identity,*** *Tiana Laurence; DHS, FACTOM IRIS* (15 minutes)

11:00-12:30	**ONC Challenge Presentations** ***ModelChain: Decentralized Privacy-Preserving Healthcare Predictive Modeling Framework on Private Blockchain Networks,*** Tsung-Ting Kuo and Lucila Ohno-Machado*; Health System Department of Biomedical Informatics, University of California San Diego, La Jolla, CA Division of Health Services Research & Development, VA San Diego Healthcare System.* Cross-institutional healthcare predictive modeling can accelerate research and facilitate quality improvement initiatives, but most existing privacy-protecting methods are based on centralized architecture which presents security and robustness vulnerabilities. We describe a new framework, ModelChain, to adapt Blockchain technology for privacy-preserving machine learning, without revealing any patient health information. We also discuss the benefits and potential issues of applying Blockchain technology to increase interoperability between institutions. *White Paper* *Contact Tim and Lucila: tskuo@ucsd.edu; lohnomachado@ucsd.edu* ***The Use of a Blockchain to Foster the Development and use of Patient-Reported Outcome Measures (PROMs),*** *Jason Goldwater; National Quality Forum* The use of blockchain can help foster the development and use of patient-reported outcome measures (PROMs) which focus on the impact of disease and its treatment from the patient's perspective. It allows the use of internet-based devices and technologies (the Internet of Things) to be used to collect data on an ongoing and regular basis for PROMs, while protecting patient confidentiality and unauthorized use of data. *White Paper* *Contact Jason: JGoldwater@qualityforum.org*
12:30-1:15	**LUNCH**

	An overview of the DHS S&T project goal, obstacles, and successes of ensuring data integrity and the digital identity of active IoT devices. This would include creating an identity log that captures the identification of a device, who manufactured it, lists of available updates, known security issues and granted authorities while adding the dimension of time for added security. *Contact Tiana: tiana@factom.com* --- **Decentralized Identifiers (DIDs): Solving the Root Identity Problem,** *Drummond Reed; Respect Network* (15 minutes) The distributed ledger technology (DLT) that powers Bitcoin, Ethereum, and other "blockchains" has the potential to solve one of the oldest and hardest problems in distributed identity management: what authority can be trusted to provide the root identity record for a person, organization, or thing? This talk with summarize how root identity records based on decentralized identifiers (DIDs) can be deployed on any suitable DLT to produce a globally scalable root identity authority that does not need to rely on any single company or government because it uses cartographic proof rather than centralized control. *Contact Drummond: drummond@respect.network* --- ***Decentralized Certification Service,*** *Adam Migus; XCELERATE* (15 minutes) An overview and status of XCELERATE Solution's DHS SBIR project which is developing a blockchain-based identity attribute management technology. This trusted independent service addresses a FEMA disaster assistance scenario in which emergency workers must independently verify their credentials to permit assistance at the site. --- **Identity and Blockchain Panel and Q&A,** (30 minutes) *Moderator: Maria Vachino* *Panelists: Adam Migus | XCELERATE Solutions; Drummond Reed | Respect Network; Manu Sporny | Digital Bazaar; Stephen Wilson | Constellation Research; Andrew Yashchuk | FACTOM IRIS* *Contact Info: maria.vachino@associates.hq.dhs.gov, anil.john@hq.dhs.gov, drummond@respect.network, msporny@digitalbazaar.com, Steve@constellationr.com, andrew@factom.org*
3:05-3:20	**BREAK**

1:15-2:45	**ONC Challenge Presentations** ***"MedRec"Using Blockchain for Medical Data Access and Permission Management,*** *Ariel Ekblaw; MIT Media Lab* We present MedRec, a decentralized record management prototype for EHRs, using blockchain architectures. Our system design gives patients a comprehensive, immutable log and easy access to their medical information across providers and treatment sites. MedRec manages authentication, auditability and data sharing; the modular API design integrates with providers' existing databases, facilitating interoperability. By contributing to network integrity, medical researchers earn access to anonymized, aggregate data. *White Paper* *Email Ariel: medrec@mit.edu* --- ***A Blockchain-Based Approach to Health Information Exchange Networks,*** *Kevin Peterson; Mayo Clinic* Sharing healthcare data between institutions is challenging. Heterogeneous data structures and disparate use of healthcare terminology limits data comprehension. We present a Blockchain-based approach to sharing patient data that trades a single centralized source of trust in favor of network consensus. We also introduce an alternative to Proof of Work that bases consensus on proof of structural and semantic interoperability using Fast Healthcare Interoperability Resources (FHIR) Profiles. *White Paper* *Contact Kevin: peterson.kevin@mayo.edu*
2:45-3:00	**BREAK**
3:00-4:45	**Experts Panel, Discussion of Next Steps and Open Q&A** **Panel:** Kyle Culver | Humana Inc.; Jason Goldwater | National Quality Forum; Greg Shannon | White House; Tony Trenkle | IBM; Andy Truscott | Accenture LLP Contact Info: kculver@humana.com, *JGoldwater@qualityforum.org, Gregory_E_Shannon@ostp.eop.gov, aftrenkl@us.ibm.com, andrew.j.truscott@accenture.com*
4:45-5:00	**Wrap Up and Closing Remarks, *Debbie Bucci*** *Contact Debbie: Debbie.Bucci@hhs.gov*

3:20-4:50	**ONC Challenge Presentations** ***Blockchain: The Chain of Trust and its Potential to Transform Healthcare - IBM's Point of View,*** *Srini Attili and Shahram Ebadollahi; IBM Global Business Service Public Sector* Blockchain creates trustworthy and efficient interactions and will play a significant role to disrupt health IT and deliver process efficiencies. The result will be a new generation of powerful, blockchain-based applications that will shape the next era of business, transform health IT and upend business models. IBM is committed to helping make blockchain real for business, to make it widely adopted and flourish with innovation *White Paper* *Contact Srini and Shahram: srinivas.attili@us.ibm.com; ebad@us.ibm.com* *IBM Point of Contact, Udit Sharma: uditsharma@in.ibm.com (Please include name and organization when emailing)* --- ***Blockchain: Securing a New Health Interoperability Experience,*** *Brian Kalis and Hanif Dharamsi | Accenture, LLP* Globally, and across multiple industries, an innovative model known as blockchain is emerging that enables faster, more efficient and highly secure business-to-business and business-to-consumer transactions. Many involved in healthcare hope the same distributed database technologies enabling this new model can drive similar results within the industry and, as with many other major innovations, recognize that confusion and hype can mask the potential of real world applications. *White Paper* *Contact Brian and Hanif: brian.p.kalis@accenture.com; hanif.s.dharamsi@accenture.com*
4:50-5:00	**Wrap-Up**