



Position Statement

Blockchain based Service Composition and Integration

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Contents

Page

1	Personal Background	3
2	Directions in Blockchain Based Identity Management Solutions	3

1 Personal Background

Joshua Daniel: Researcher in BT, Research & Innovation, Security Futures Practice.

His research has been focused on cloud security, Blockchain & crypto-currency technologies. Him has filed multiple patents in securing Blockchain and utilizing such technologies for service integration, risk based access and identity management, secure code distribution and secure data sharing techniques. Joshua also has expertise in Semantic Web, Linked Data, Cloud Computing & Information Security. He has a PhD in using Semantic Web and Linked data concepts for secure data sharing in Enterprise context and a BEng with First Class Honors from the University of Southampton UK; he has also worked for Rolls-Royce plc.

Our BT Research and Innovation team has patented in excess of 10 patents related to blockchain including Identity Management, Blockchain attack detection, or Blockchain driven service optimisation.

2 Directions in Blockchain Based Service Composition and Integration

The topic for discussion that I would like to propose is the use of Blockchain platforms as micro-services composition framework. The interest here is in enabling personalization of services using smart contracts and Blockchains to enable creation of unique and personalized super-services that are compositions of distributed micro-services.

Service Integration tasks can end up being very complex, this being primarily due to the contrasting information flow needs, i.e., top-down flow of identity and access management information, as opposed a bottom-up data collection approach needed to carry out accounting and billing. With the creation of Blockchain aware micro-services, both those functions can be off-loaded to an external Blockchain. A composite service can thus be defined using multiple smart-contracts that may be distributed on multiple ledgers. This allows for interoperability with transferable and interoperable 'personal values' such as reputation, debt, access rights, digital assets and so on.

Such personalization can then also be extended to provide optimized use of a user's resources. An example being able to maximize a user's bandwidth usage based to ensure minimum quality expected from concurrently running services. This also allows budget driven service composition with optimized evolutions.

Another advantage of utilising Blockchain in such a way will be that an Organisation can value the risk associated with use of individual services and thus have visibility & control over usage profiles of its members. A Blockchain ability to restrict the net value available can provide a novel risk based access management system. A simple example being the enforcement of a Blockchain based cost for using a password and the password reset can then based on the usage. This allows for usage control at an organizational and user level with an oversight.

Some of the challenging questions that this approach poses:

- 1) How does risk evolve with usage and what models to use accept varied risks such as from multiplicity of devices or access from virtual devices.
- 2) What risk mitigations actions can be automated.
- 3) How to enforce risk management and create Blockchain aware services.

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