

How a long trusted institution, the French Post Office, is tackling blockchain technology with the help of IRT SystemX

Alain Roset, La Poste;

& François Stephan,

assistant general manager in charge of development and international affairs at the Institut de Recherche Technologique (IRT) SystemX

In J.P. Dardayrol, editor of the special issue *Blockchains and smart contracts: The technology of trust?* of *Réalités industrielles*, 2017

Abstract:

The prediction has been made that blockchain technology, via the digital revolution and the “power of the multitude”, will deeply change the role of trusted third parties. This new breakthrough technology is even said to have the power to radically alter business models, not only those that have prevailed for decades or centuries but also more recent ones. The French Post Office, a historically trusted party for centuries now, has been staking out an ever stronger position on the Internet and in digital trust services, thus warranting its role as a trusted third party in both the real and virtual worlds. Investing in blockchain technology since 2014, La Poste Group formed, in 2016, a partnership with IRT SystemX, a research institute with industrial and academic credentials. The aim is to accelerate the cycle of innovation in this public service thanks to this new technology.

Information technology has left its marks on the past decades, having changed society and upended businesses.¹ Since the first electronic calculating machines in the mid-20th century and their theorization by Alan Turing, several waves of technology have unfurled. The Internet has set off a revolution in exchanges between individuals since it allows for the creation and publication of information passed on to ever more varied and numerous terminals. Since its first application (bitcoins; the cryptocurrency launched in 2009), blockchain technology conveys decisive factors at the service of digital innovations: “disintermediation”, transparency, immutability, availability and security. These characteristics suggest a new generation of trust services.

To cope with these rapid changes, the French Post Office must understand them so as to adapt its offers and processes while retaining its historic, vested values.

The French Post Office, a history

Assigned the duty of bearing messages (at first for the king alone and then, under Henry IV, for private persons) six centuries ago, the Post Office has wended its way through a tumultuous landscape. During the French Revolution, a law in 1791 made the mail secret and inviolable. The principles of the neutrality of the postal service and of the privacy and secrecy of the contents of correspondence (and associated “metadata”) were institutionalized. They have become part of

¹ This article exposes the views of the authors, not of La Poste Groupe. It has been translated from French by Noal Mellott (Omaha Beach, France).

in-house procedures, such as the “postman’s oath”, which employees have, since 1790, had to take during a solemn ceremony.

The French population soon came to trust postal services. This confidence has been the grounds for rolling out new products: money orders for financial transactions (successfully launched at the start of the 19th century) and then savings accounts (Livret A). La Poste finally became a bank in 2006. Public confidence also underlaid the development, during the 1970s, of mail-order services, a thriving business in France that depended on catalogs and advertisements being reliably delivered along with the mail that, between companies and customers, contained orders, payments and packages.

Technological changes have been systematically integrated into the offers made by La Poste and into its procedures, whether changes in the means of transportation (from horses to nighttime flights and electric vehicles) or in communications (remote banking by Minitel as of 1980, the equipment of post offices with individual computer terminals in 1984, and of mail carriers with smart phones in 2012).

The societal implications of ICT for the Post Office

Mainly centered in firms’ internal processes, the first rollout of information and communications technology (ICT) marginally affected the postal market. True, the mail between firms migrated completely toward e-mail, and structural adjustments (via electronic data interchange, EDI) were made to facilitate information flows for invoicing. However this reduction in the flow of mail was mostly offset by the growth in the volume of advertisements sent to households.

At the end of the 1990s however, the spread of personal computers in French homes, along with the upsurge of the Internet, reshaped social relations and altered communications between persons and businesses. This started affecting the postal market as the volume of advertisements and mail orders fell, and as distance selling moved on-line and became much more “dematerialized”. Newspapers and magazines, which relied on home postal delivery, were heavily and visibly impacted.

Contrary to initial predictions however, the model of technological development based on the (very open) TCP/IP protocol reinforced the position of intermediaries: trusted third parties and the often monopolistic two-sided platforms known under the acronym GAFA (for Google, Apple, Facebook, Amazon). By making up for this protocol’s original shortcomings, these platforms were able to offer value-added services. In the meantime, spam, fake news and phishing have, day after day, been demonstrating the underlying technical system’s fragility.

As in the telecommunications market, EU economic policy was opening European postal systems up to competition. This forced each operator to devote serious thought to a long-term strategy for coping with competitors (who, in fact, did not materialize) and with the gradual “dematerialization” of exchanges between firms and private persons.

La Poste Group reacted to this new situation by europeanizing its distribution of packages (prior to the upsurge in e-commerce). In addition, it staked out an original position (different from that of other European post offices) covering the mail market’s full value chain. Digitization, well advanced in this value chain, soon endowed the Group with new ICT qualifications for handling advertisements and transactions. In association with the post office’s cultural and historical legacy, these qualifications led the Group to take advantage of the indispensable forces of synergy in a society not yet fully won over to the most recent technological tools: it has staked out a position as trusted third party in both in the real world and the digital realm.

The introduction in 2008 of the Bitcoin protocol, a sophisticated arrangement of technological procedures drawn from research in cryptography and distributed information-processing, could signal a new ICT breakthrough that will have an impact on relations between individuals and with complex, automated systems. Blockchains are, it is usually claimed, a technology for building up

confidence between parties who do not, at the outset, trust each other (with reference to the metaphor of the “Byzantine generals’ problem”). They can be a medium for transactions without the intervention of a trusted third party, the latter having been replaced with the “multitude”. A lively, thriving business environment has sprung up worldwide with its start-ups, financiers, developers, “miners” and gurus who are all preparing the coming societal revolution, whence a large number of experiments.

This innovation has forced La Poste Group to reposition itself as a trusted third party. The Group is actively on standby while it tries to assess the unspoken risks and opportunities under all the “buzz” and “hype” vented about blockchains. Given its pragmatic realism, grounded on the daily contacts of mail carriers with the French population, La Poste has drawn its first, still tentative, conclusions about these polymorphous, (but technically, financially, legally and organizationally) innovative concepts:

- The idea of a trusted third party is less central in a blockchain but still quite present, on the periphery, for managing identifications and keys (for access) and validating the information entered for transactions (*e.g.*, oracles).
- Basing trust on a control by the “multitude” requires a transition period during which third parties will still be needed.
- Practical and theoretical questions of a legal and business sort must be addressed about the conditions for diffusing this technology beyond the cryptocurrency business.
- Given that transactions are associated with a cryptocurrency, both transactions and this currency must be managed. New business prospects thus arise for launching start-ups and running blockchain services.

Blockchain technology is still immature. Consensus procedures in a distributed system have been under study since 1985. Furthermore, the immutability of “smart contracts” will require formal proof of the code. Given the need for deeper scientific studies, French research in computer science could shore up its worldwide renown by solving use cases. The weak points detected in blockchains must be scrutinized, whether to develop new, carefully tested algorithms or to create interfaces with existing services in a constructive synergy.

A new, open R&D approach for accelerating innovation

To conduct this research, La Poste is participating in Labchain Initiative, which, launched by the Caisse des Dépôts, focuses on the banking and insurance industry. It has become clear, however, that part of the work on applying blockchain technology to other markets where La Poste is present could be done in a joint working environment with French academic teams. Since the end of 2016, La Poste is relying on Institut de Recherche Technologique (IRT) SystemX, located in Saclay (near Paris), for part of this work in R&D.

IRT SystemX, a new partner in programs of research and innovation, was set up in 2012 with support from the Investments for the Future Program. It brings together the skills and platforms of more than seventy corporate partners (big groups, small and medium-sized businesses and start-ups) and twenty academic partners active in R&D projects on digital engineering in complex systems. Its goal is to boost the digital transition in French industry and in local and regional authorities.

At the end of 2016, IRT SystemX launched a four-year R&D program on blockchain technology. Several firms who use this technology (including La Poste) are taking part therein. They can thus pool efforts and share the advances made in using this foundational innovation. Industrial firms of various sizes work with researchers from Paris-Saclay University, INRIA (in partnership with the University of California, Berkeley), Télécom ParisTech, Versailles Saint-Quentin-en-Yvelines University and research engineers from IRT SystemX.

By actively, and financially, participating in this program, industrialists share good practices in matters related to blockchain innovations while profiting from a cross-fertilization of the technological advances being made in applying blockchains to mobility, logistics, energy, telecommunications, security and finance. IRT SystemX will develop an experimental platform for building models, making simulations, and assessing the coupling of blockchain techniques via innovative uses of this technology. The goal is to accelerate innovation in this field.

This program will study, in the main, the following problems: the scalability of blockchains, the concept of digital trust (privacy of data, cybersecurity), consensus and validation procedures for transactions, the governance of blockchain-based services, tests of the maturity of the techniques incorporated in a blockchain, cross-chain interoperability and integration, business models, acceptance by society, and legal aspects.

In the spring of 2017, IRT SystemX launched START@SystemX, a program intended for start-ups working on blockchains. Start-ups will be selected and offered the opportunity to work on the development of blockchains by collaborating with IRT SystemX's corporate and academic partners via the Institute's experimental research platform.

Conclusion

Toward 2020, several trust services will probably rely on blockchains, mainly in the consortiums that are gradually opening toward other partners. "Bunches" of securely interconnected services will form. Many postal services could be modernized by reaping the advantages of blockchains, namely: unique records, transparency, the possibility of auditing all operations and the immutability of data. To adapt to this new technology, La Poste Group will have to reposition itself as a trusted third party. It must reckon with the system's fragile aspects: governance by all stakeholders, scalability, the physical identification of users and the weak points on the periphery of the central chain. This supposes that certain regulations will be opened so as to retain their finality but without imposing precise methods of implementation.

This global view calls for mustering the country's scientific resources around the themes (whether proposed by research establishments or start-ups) coordinated by IRT SystemX's project "Blockchain for Smart Transactions".

Let us hope that the participation of La Poste Group in this program will help it formulate new offers, integrate this new technology, and place it at the service of all French citizens.

1477 Louis XI created a royal postal service, La Poste d'État, for the king's messages exclusively. He also set up the system of way stations.

1603 Henry IV turned the royal postal service into the first post office for carrying private correspondence.

1790 Employees began taking an oath on the secrecy of the mail.

1817 Introduction of the postal money order, an alternative to the actual transportation of cash.

1829 Creation of a service of recommended letters.

1849 The first issue of stamps (bearing the effigy of Ceres by Jacques-Jean Barre).

1881 Creation of the savings passbook (Livret d'Épargne et de la Caisse Nationale d'Épargne).

1881 Introduction of the parcel post service.

1912 First official airmail flight in France between Nancy and Lunéville using a Farman biplane.

1918 introduction of postal checking accounts.

1972 Creation of the 5-digit postal (zip) code for automated mail sorting.

1984 First postal high-speed train (TGV).

2000 In August, La Poste launched @laposte.net and offered an address for free to anyone in France. GeoPost, the logistics and parcel post pole of La Poste Group, was set up.

2003 Cap Qualité Courrier, a program of industrial modernization.

2006 Banking activities became a subsidiary, La Banque Postale, with the status of a bank.

2010 La Poste Group changed its status to become a 100% public limited corporation: La Poste S.A.

2016 First regular mail service by drone.

Table 1: *Milestones in the history of the French Post Office, La Poste*