A *deep* Transformative Improvement in Trade & Commerce

Any networked individual, organization or machine will soon have available a common ubiquitous method to freely publish computational algorithms to the Internet, and to automatically fetch and compute required or desired algorithms on-demand from the Internet.

AN INTERNET OF RULES

The Emergence of an Internet of Rules Would Help Deliver Global Trade Priorities

Xalgorithms Alliance is dedicated to enabling one relatively simple improvement to commerce, with enormous potential effect. An emergent *"Internet of Rules" (IoR) will make it practical and cheap for computational algorithms to be published to, and fetched from the Internet in a standard, efficient and flexible way in support of any transaction, hosted on* any platform, *and meeting the requirements of any jurisdiction.*

Xalgorithms Alliance is a contract-based association of members committed to fostering a free/libre/open Internet of Rules to advance the fairness and efficiency of commerce. Xalgorithms Foundation Inc. is a not-for-profit corporation operating globally from Ottawa, Canada to assemble and provide support to Xalgorithms Alliance in pursuit of this goal.

Trade Facilitation Agreement

• Signatory Countries would benefit from an enormous reduction in the costs of maintaining and deploying rules such as tariffs, taxes, hedging methods and benchmarks.

• Single Window Systems & Intermediaries would obtain automation-ready tariff, tax, exemption, exception, credit, and zero-rating rules for faster, more assured compliance.

• Buyers & Sellers would find cross-border trade administration reduced from days or weeks to seconds or minutes. Micro, small and medium firms have the most to gain.

• Trade Analysts will obtain, within appropriate disclosure controls, new high-precision near real-time data streams and collections, supporting their many value-added services.

The Xalgorithms' founding community has successfully delivered the essential 'alpha' software and systems for an Internet of Rules.

Collaborate on the universal. Compete on the unique. Participate in 100% Free/Libre/Open Design Research & Development to Enable Reciprocal Interests of Government, Commercial, Civil Society and Multilateral Oganizations

XALGO

Xalgo is a domain-specific table-style language specification with deliberately low expressibility (narrow 'white list' of characters and patterns) for inherent security, combined with lightning-fast network transmission, and nearly instantaneous in-memory computation.

This language supports two strictly-defined message types, in the form of ordered lists (JSON tuples): Xalgo-Fact message states what is occurring ('positive' fact), received from a transaction solution; Xalgo-Rule message states what ought to occur ('normative' assertion), sent back to the solution.

A development environment to manage rule portfolio, tech syntax/grammar, version and identity is called Xalgo-Author. Independent organizations can offer related services for algorithm integrity checking (Xalgo-Verify) and operation-system-residual risk management (Xalgo-Indemnify).

XATP

XATP is our proposed "External Algorithms Transfer Protocol" dedicated to the Internet transmission of computational algorithms using the Xalgo specification. This would provide higher trust and risk control at an intermediate level between the member-only SWIFTnet and everybody's Internet. It would allow only a narrow 'white list' of characters and patterns.

We're drafting a Request for Comment (RFC) based on Internet Engineering Task Force (IETF) RFC3080 https://tools.ietf.org/html/rfc3080. If approved XATP would operate over TCP/IP on par with HTTPS (hypermedia Web), XMPP (messaging IoT, WebRTC, social), FTP (files) and SMTP (email).

XAHRE

XAHRE (nicknamed "the czar") is a flexible "External Algorithms High Resilience Environment" to support Interlibr and XATP core computing services once this is warrented by effective demand. Currently during 'alpha' the IoR systems are running on a commercially-hosted 'cloud' service. At a certain point IoR services would run on physically- jurisdictionally- and organizationally-distributed infrastructure.

INTERLIBR

Interlibr (nicknamed "the is-ot-bot") receives Xalgo-Fact messages (is occurring), and responds with Xalgo-Rule messages (ought to occur).

This is a high-volume low-latency request-response processor with an integrated distributed repository and secure messaging service. Its function is to rapidly map-filter-reduce all the "in effect" and "applicable" Xalgo-Rule messages based upon each incoming Xalgo-Fact message.

LICHEN

Lichen is a 'lightweight' interface app to configure and monitor the Xalgo-Fact information that you (buyer or seller) send, and to review and manage the Xalgo-Rule information you receive.

Lichen will run on mobile, browser and voice devices, and exchange data through the API of any commerce and payment platform, whether peer-to-peer or client-server. Lichen expects and delivers transaction data in global standard schema, such UBL or 20022.

Advance the Pragmatic Efforts of XALGORITHMS Alliance

Strategic Implementer Organizations:
Funding contributor and free/libre/open R&D participant.

R&D Donors:
Financial or in-kind (e.g. personnel time) contributor to advance the IoR mission.

External Advisors / Board Members:
Consultative assistance to advance the IoR mission.

Participate now in testing the current IoR 'alpha' implementation.

Assist with the free/libre/open development of IoR capabilities.

Collaborate in writing automated rule sets that enable (that don't erode!) contractual intent.

Informal "Community Groups" (XCG)

Formal "Working Groups" (XWG)

A 3-Tier Framework

Micro: Behaviours of decision-makers amongst organizations

Meso: Rules and practices of whole industries and markets

Macro: Characteristics of whole societies and economies

Meso-level interventions which enhance micro-level performance tend to proliferate, and upon reaching critical mass, can result in transformative macro-level emergent effects.

An Internet of Rules is a generalized meso-level method for transmitting and fetching algorithms on the Internet. Any networked individual, organization or machine will soon have available a common ubiquitous method to freely publish computational algorithms to the Internet, and to automatically fetch and compute required and desired algorithms on-demand from the Internet.

An "Internet of Rules"

api data

find rules

Xalgo-fact

Buy

Sell

Xalgo-fact messages find Xalgo-rules

Xalgo-rule Authoring

Xalgo-rule

report findings

deliver findings

publish rules

LICHEN   INTERLIBR   XALGO

Through 2019 we invite additional commercial, governmental, multilateral and other non-for-profit organizations to collaborate in the following tangible R&D priorities:

1. Help "prime the pump" by transcribing various types of rules for IoR operation: taxes, tariffs, credits, discounts, subsidies, fees, benchmarks, points systems and indicators.

2. Cultivate with us a global community committed to reducing the time required for an emergent Internet of Rules to earn a business-ready reputation.

3. Let's ensure qualitative goals such as genuine accessibility and inclusiveness; user-centred design; global - to-local relevance; rigour in security, identity and risk management; fair and dependable free/libre/open governance, and responsible intellectual asset management.

4. We are working to diversify our core resourcing in 2019 amongst at least a dozen commercial, governmental, multilateral and not-for- profit organizations.

Xalgo4Trade

There is an enormous cost and risk for existing services that automate commerce and payment rules (tariffs, taxes, exemptions, subsidies, sanctions, KYC, AML, PEP) and trade documents (purchase orders, bills of lading, certificates, authorizations). Authorities publish the rules in natural language. Implementers must work constantly to transcribe and maintain every detail up-to-date and error-free in their preferred executable programming languages, for every relevant jurisdiction and trade agreement.

Xalgo is a generalized means of expressing each computable function of legislation, regulation, policy, standard or agreement. It is human-readable and is also directly executable. This can be embedded or automatically transcribed into any other programming language (C++, Java, Ruby, Python, SQL, R, etc.). Platform-independent Xalgo can be placed in a 'schedule' to legal texts on equal footing operationally, but subordinate to the natural language text endorsed by legislators.

This means companies and governments can leapfrog straight to "Trade Policy 3.0". Next-generation trade agreements can be "born digital".

Xalgo4Price

Xalgo-Fact and Xalgo-Rule messages can be used for consistently transmitting worth, money and price information over the Internet at any scale, and with any payment means, respecting the concurrent relational, tangible and imaginary character of money in all its forms.

We have several "tabular standards" of worth (suitable for money or for price) now under development:

- Primary Commodity Reserves
- Consumer or Producer Goods and Services
- Fraction of Total Market Capitalization
- Trends in Resource & Ecological Productive Capacity

Such meso-level benchmarks are equally useful in macro and micro contexts:

- Macro-Level for Money: Currency Unit Benchmarks
- Micro-Level for Price: Price Adjustment Clauses

emergent

Trade 3.0 is lifting off rapidly, eclipsing Trade 2.0

	Trade 1.0	**Trade 2.0**	**Trade 3.0**
Media	Ink & Pulp-based Paper	Digital Paper HTML, PDF	Executable Components
Codification	Natural Languages	Natural Languages, XML	Algorithms, XML, JSON
Communication	Published Guides, Forms	Digitized Guide, Forms	Automated, Transparent
Compliance	Costly, Difficult	Less Costly, Difficult	Automated, Transparent
Inclusiveness	Capability Dependent	Inclusive-Capability	Ubiqitous
Consistency	Low: Diverse	Moderate: Single Window	High: Interoperable

A Treaty on Money

The Statute of the International Court of Justice applies "international custom, as evidence of a general practice accepted as law". The International Institute for the Unification of Private Law (UNIDROIT) expresses the global legal principle of contract integrity: "A contract shall be interpreted according to the common intention of the parties."

Imagine, then, a formal treaty committing each signatory to ensuring that their laws, policies and actions will uphold (and not erode) contractual intent amongst all signatories regarding worth, money and price.

We have begun drafting a possible section for such a treaty. It's a type of mutual non-aggression pact based upon existing legal principles in the Tallinn Manual 2.0, and in Customary International Humanitarian Law, which prohibit indiscriminate weapons and attacks. In the event of a trade or financial war, it would prohibit use of the listed types of indiscriminate trade and financial weapons and attacks. While always prioritizing peaceful relations and methods, this limited-purpose treaty would not restrict the use of any type of targeted algorithmic trade or financial weapon or sanction in economic warfare affecting particular individuals, organizations or assets.

Next-Generation Global Trade Facilitation

Trade Policy 2.0. The World Trade Organization (WTO) agenda has moved forward with the entry into force of the *Trade Facilitation Agreement* (TFA) on 22 February 2017.

The WTO TFA is an agreement to streamline various administrative and legal factors affecting cross-border logistics and payments. It is also the first multilateral agreement on digitally-enabled trade. It commits signatories to so-called "Single Window" electronic trade data management. This means trade data is to be standardized and will need to be entered into the system only once. This will eliminate the time, cost, tedium and error associated with repetitive manual keying and retrieval of the same data. The agreement also sets new legal requirements for national governments to employ current-generation Internet-based technology in fostering the conditions for "easier trade" and greater transparency.

Under the TFA, WTO member countries must publish online the details of their import/export procedures, accept e-payment methods, and provide electronic forms for official documentation by the parties engaged in cross-border trade. Additionally, there are provisions to expedite the clearance and release of goods, and for the development of end-to-end "single window" trade administration services.

Trade Policy 3.0. The simultaneous emergence of new methods and technologies enabling algorithmic legislation and contracting, enhanced identity management, and new types of payment, together provide government and commercial stakeholders the practical means to fast-track implementation of the TFA, and indeed to advance it towards a "Trade Policy 3.0".

The TFA text itself makes no specific reference to the automation of trade rules, nor to algorithmic law or contracting. However it is clear that the globally distributed and legally binding algorithmic expression of a country's tax, tariff and other trade rules, integrated with the new generation of identity and payment systems coming online, can further automate cross-border commerce administration for buyers, sellers and intermediaries.

Contracts, standards, legislation, regulations and agreements often contain computational functions (i.e. "rules"), but even when published in digital form, these are typically described only through natural language. The emergence of an Internet of Rules makes it worthwhile for these sections to be enriched with machine- readable XML mark-up of the "control variables", together with a simple plain-text "control table" in JSON to express the procedural relations amongst them, so they are suitable for automation. Benefits can be realized in pace with market comprehension, technical interoperability and legal due diligence.

micro
meso
macro

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XALGORITHMS

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