Automation of Legislation

2017-2020

Adapted from a Presentation on 16 May 2017
to the Digital Caucus, Government of Canada

AN INTERNET OF RULES

XALGORITHMS Foundation

About Us

Joseph Potvin

Executive Director
Xalgorithms Foundation

2002-2012 Coordinator of “Intellectual Resources Canada” at PWGSC & TBS to enable free/libre/open source implementation throughout the Canadian Government

2006-2012, Manager, IT Expenditure Analysis and Reporting, CIOB, TBS

William Olders

Chair of the Board
Xalgorithms Foundation

Founder & CTO, DataKinetics (Retired)

Ken Holman

Chair, Standards Council of Canada (SCC) shadow committee to ISO TC 154

Designated Canadian expert to UN/CEFACT, the United Nations Committee for Trade Facilitation

Chair, Universal Business Language TC - co-editor ISO/IEC 19845:2015

Don Kelly

Lead, Software Systems Design & Development, Xalgorithms

XALGORITHMS Foundation

Automation of Legislation: Goals & Enablers

Goals

- Simplicity
- Fairness
- Autonomy
- Interoperability
- Consistency
- Convenience
- Neutrality
- Reliability
- Popularity

Enablers

- Free/libre and open source terms
- Open standards and specifications
- Open horizontal management
- Open computing stacks

XALGORITHMS Foundation

Algorithms in Legislation

Computational rules in legislation

- Taxes, tariffs, subsidies (exemptions, credits, criteria-based reductions)
- Algorithmic contracts (indexing to inflation, exchange rate or location)

e-Commerce Law

- UNCITRAL (Model Law on Electronic Transferable Records)
- Authorship ≠ possession ≠ control

and so it is with

Canada's Fiscal Rules

- Authorship ≠ possession ≠ control

XALGORITHMS Foundation

Agenda

1. **Automation of Legislation: Goals & Enablers**
   - "Free/libre" and "open source" software licensing terms
   - Open standards and specifications
   - Open horizontal initiatives
   - Open computing stacks
   - Open markets: Trade 1.0, Trade 2.0, Trade 3.0
2. **How to Automate Legislation**
   - Part 1: An Internet of rules
   - Part 2: Mobilize a regulation
   - Part 3: Simplicity, fairness, etc.
3. **Benefits: technical, business, governance, strategic**
4. **What is the next step?**
5. **Discussion**

XALGORITHMS Foundation

Free/Libre & Open Source

XALGORITHMS Foundation

Free/Libre and Open Source

Demand Side: User

Freedom 0: Freedom to run the program for any purpose.

Freedom 1: Freedom to study how the program works, and adapt it to one's needs. Unencumbered access to the source code is a precondition for this.

Freedom 2: Freedom to copy the program and to redistribute copies.

Freedom 3: Freedom to improve the program, and release any modified versions. Unencumbered access to the source code is a precondition for this.

Supply Side: Producer

Permit free redistribution
Publish source code
Welcome derivative works
Respect integrity of author's source code
Ensure the license is technology-neutral
Do not discriminate against persons or groups
Do not discriminate against fields of endeavour
Do not link with non-disclosure agreements
Do not tie the license to a particular product
Do not restrict other software's terms and conditions

XALGORITHMS Foundation

Free/Libre and Open Source

Some Challenges Require Ubiquity to Be Resolved

- e.g. Equitable use of the planet's resources
- e.g. Minimizing and mitigating adverse climate change
- e.g. Managing healthcare costs

Such Challenges Have Two Indispensable Properties

- Diverse communities need to work together to achieve such goals
- Fiscal instruments are required to encourage/discourage behaviours

Free/libre/open terms & conditions help to accomplish this

- Collaborative
- Highly scalable

XALGORITHMS Foundation

Free/Libre and Open Source

Automation of legislation requires ubiquity to succeed

The free/libre/open way makes ubiquitous deployment practical

- Presenting minimal barriers for adoption
- Reducing or eliminating complexity
- Providing accessibility to all parties of a transaction
- Supporting any context: G2B, G2C, B2C, B2B, P2P, etc.
- Implementing global open standards (e.g. ISO/IEC 19845 & ISO 20022)...

XALGORITHMS Foundation

Free/Libre and Open Source

Free/libre/open source solutions tend to engage international open standards & specifications by default

Open standard XML makes data exchange practical & ubiquitous

- Universal Business Language (UBL, the ISO/IEC 19845 standard)
  - **Business document** framework
  - Business data schema
- Universal Financial Industry Message Scheme (the ISO 20022 standard)
  - **Financial messaging** framework
  - Financial data schema

XALGORITHMS Foundation

Open Standards and Specifications

XALGORITHMS Foundation

Open Standards & Specifications

Traditional paper business documents & financial messages

- Expensive, wasteful, prone to intervention error, slow

Traditional electronic records interchange (e.g. invoicing)

- Dominated by third parties that may have restrictive business models
- Performance improvements often defeated by implementation burdens
- Entire constituencies of users could be ignored or unaccommodated

Open specifications and implementations

- Promote integrity, security and ease of adoption (on-boarding)
- Result in an open marketplace of implementation and innovation for all

XALGORITHMS Foundation

Open Standards & Specifications

Open standardization facilitates automation of legislation

- Known information of a document (e.g. invoice details) can be readily supplemented with unknown information (e.g. taxes, tariffs, exemptions, etc.) from diverse sources

The 4-corner model facilitates automation of legislation

- All participants have authoritative sources for applicable rules
- Rules are expressed in an unambiguous machine-processable way
- Rules implementation is independent of interchange

XALGORITHMS Foundation

Open Horizontal Management

XALGORITHMS Foundation

Open Horizontal Management

Example: Section 29.2(1) of the Financial Administration Act, Government of Canada

“A department may provide internal support services to, and receive internal support services from one or more other departments, while the provision of those services may be through collaboration among departments.”

Open Horizontal Management

Example: Intellectual Resources Canada (IRCan) Initiative

Business structure inside government for:
- Horizontal reuse
- Collaboration
- Flexibility

Amidst:
- Severe financial constraints
- Severe time constraints

XALGORITHMS Foundation

Open Horizontal Management

Example: Intellectual Resources Canada (IRCan) Initiative

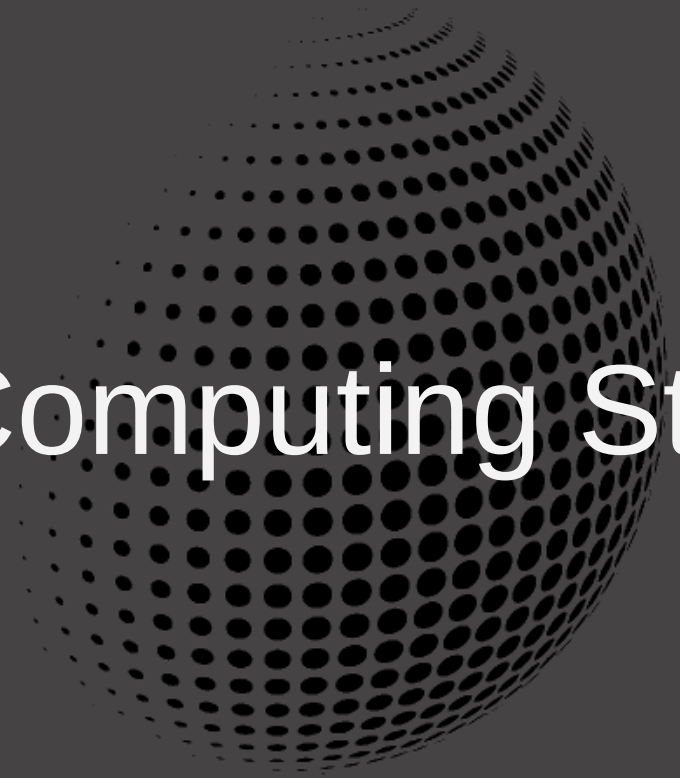
Collaboratively implemented by directorates in 6 departments
Results in 1 Year (FY2010-2011):

"We've seen a 75% savings in cost, and significantly advanced our timelines."

"What would have taken us two years to put into place, we accomplished in three weeks."

"It is unbelievably cost-effective, by as much as a factor of 10."

XALGORITHMS Foundation



Open Computing Stacks

XALGORITHMS Foundation

Open Computing Stacks

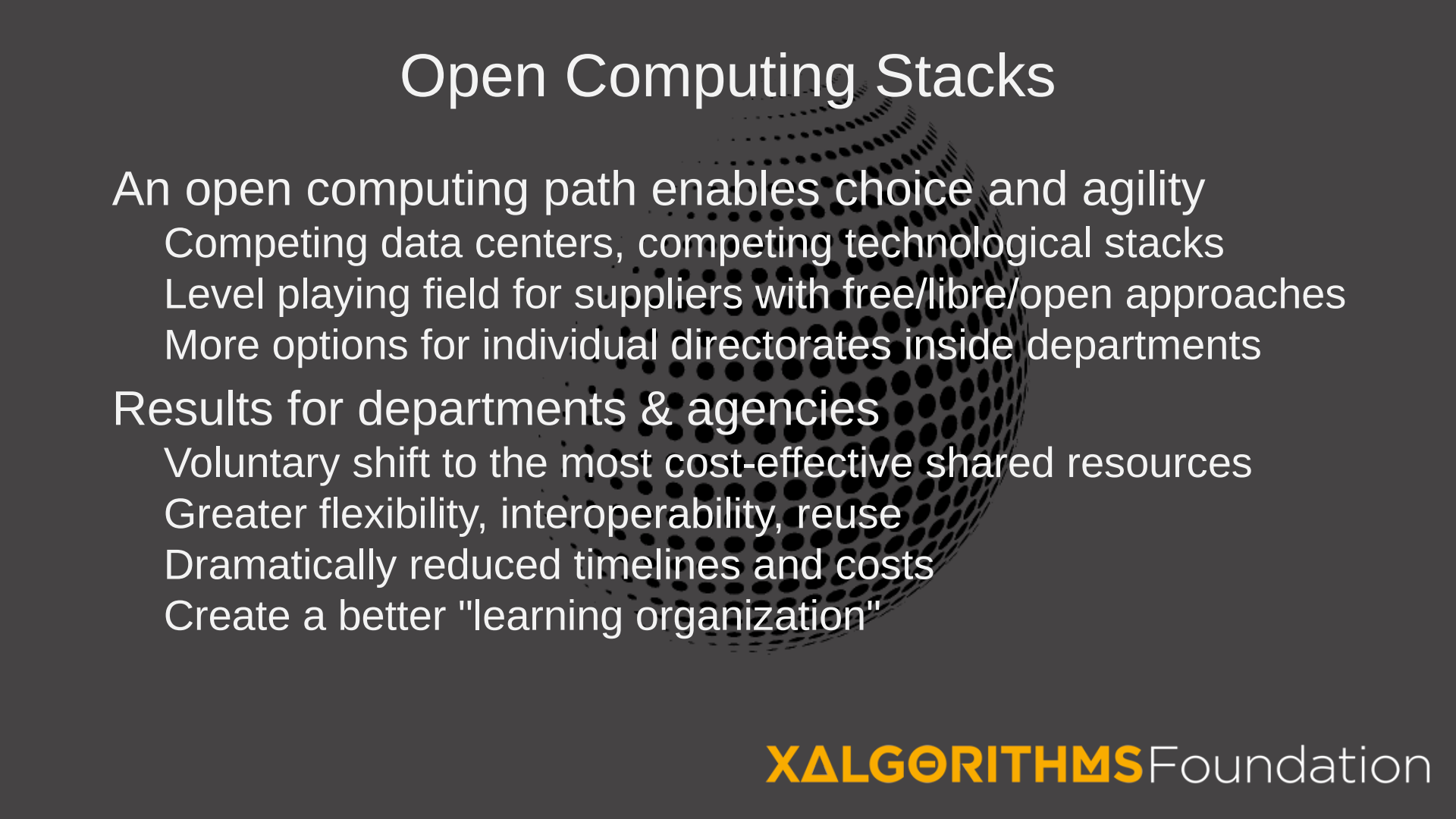
- Generic hardware + free/libre/open software
  - Remove restrictions of any particular suppliers
  - Empower your personnel to:
    - Tune and customize without legal complications
    - Clone assets without significant new spending
    - Scale, inter-operate, reuse, collaborate, share
    - Experiment (“We make it cheap to fail!”)
    - Obtain orders-of-magnitude performance improvements

XALGORITHMS Foundation

Open Computing Stacks

An open computing path enables choice and agility
- Competing data centers, competing technological stacks
- Level playing field for suppliers with free/libre/open approaches
- More options for individual directorates inside departments

Results for departments & agencies
- Voluntary shift to the most cost-effective shared resources
- Greater flexibility, interoperability, reuse
- Dramatically reduced timelines and costs
- Create a better "learning organization"



XALGORITHMS Foundation

Open Markets

XALGORITHMS Foundation

Open Markets (Canada)

“Canadian Free Trade Agreement” (April 2017)

CBSA: “Step-by-Step Guides to Importing & Exporting to/from Canada”

	CANADIAN TRADE 1.0	CANADIAN TRADE 2.0	CANADIAN TRADE 3.0
MEDIA	Ink & Pulp-Based Paper	Digital “Paper” HTML, PDF	Executable Components
CODIFICATION	Natural languages	Natural languages	Algorithms, XML, Data
COMMUNICATION	Published Guide, Forms	Digitized Guides, Forms	Automated, Transparent
COMPLIANCE	Costly, Difficult	Less Costly, Difficult	Automated, Transparent
INCLUSIVENESS	Capability-Dependent	Capability-Dependent	Ubiquitous
CONSISTENCY	Low: Diverse	Moderate: Single Window	High: Interoperable

Open Markets (Global)

WTO “Trade Facilitation Agreement” (TFA, February 2017)

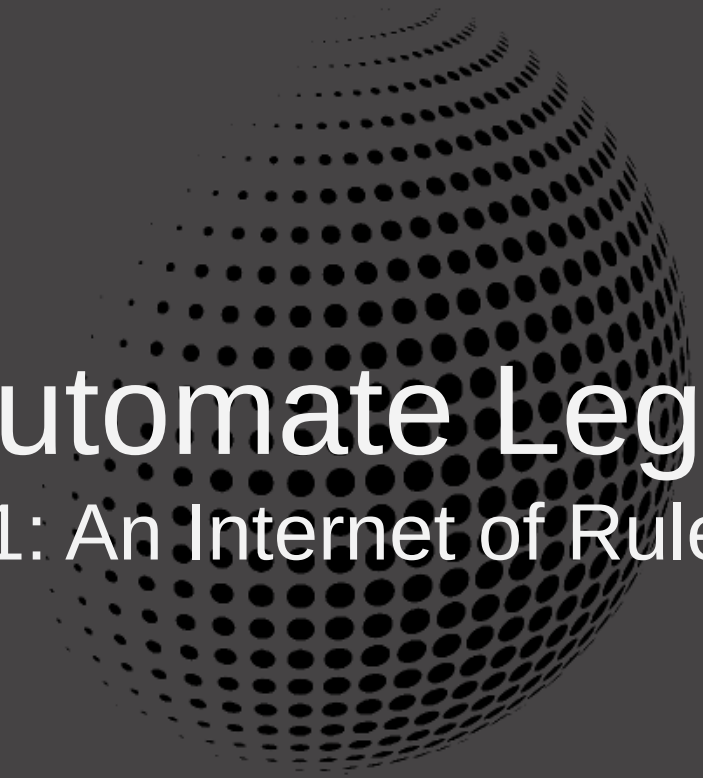
UNCTAD “Automated System for Customs Data” (ASYCUDA World, 2016)

	GLOBAL TRADE 1.0	GLOBAL TRADE 2.0	GLOBAL TRADE 3.0
MEDIA	Ink & Pulp-Based Paper	Digital “Paper” HTML, PDF	Executable Components
CODIFICATION	Natural languages	Natural languages	Algorithms, XML, Data
COMMUNICATION	Published Guide, Forms	Digitized Guides, Forms	Automated, Transparent
COMPLIANCE	Costly, Difficult	Less Costly, Difficult	Automated, Transparent
INCLUSIVENESS	Capability-Dependent	Capability-Dependent	Ubiquitous
CONSISTENCY	Low: Diverse	Moderate: Single Window	High: Interoperable

Open Markets

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	Algorithms, XML, Data
COMMUNICATION	Published Guide, Forms	Digitized Guides, Forms	Automated, Transparent
COMPLIANCE	Costly, Difficult	Less Costly, Difficult	Automated, Transparent
INCLUSIVENESS	Capability-Dependent	Capability-Dependent	Ubiquitous
CONSISTENCY	Low: Diverse	Moderate: Single Window	High: Interoperable



How to Automate Legislation

Part 1: An Internet of Rules

XALGORITHMS Foundation

How to Automate Legislation

Imagine if all the computational parts of legislation could be published to, and fetched from the Internet in a standard, efficient and flexible way for:

- Any transaction
- Any platform
- Any jurisdiction

XALGORITHMS Foundation

AN INTERNET OF RULES

rule author

authoring
application

XALGO

expression
specification

any
repository
service

registry
Id & version

compute
kernel functions
context functions

operate
schedule queues,
respond & query

store
functions, tables
& activity logs

rule user

interface
omnichannel

service
event-result api

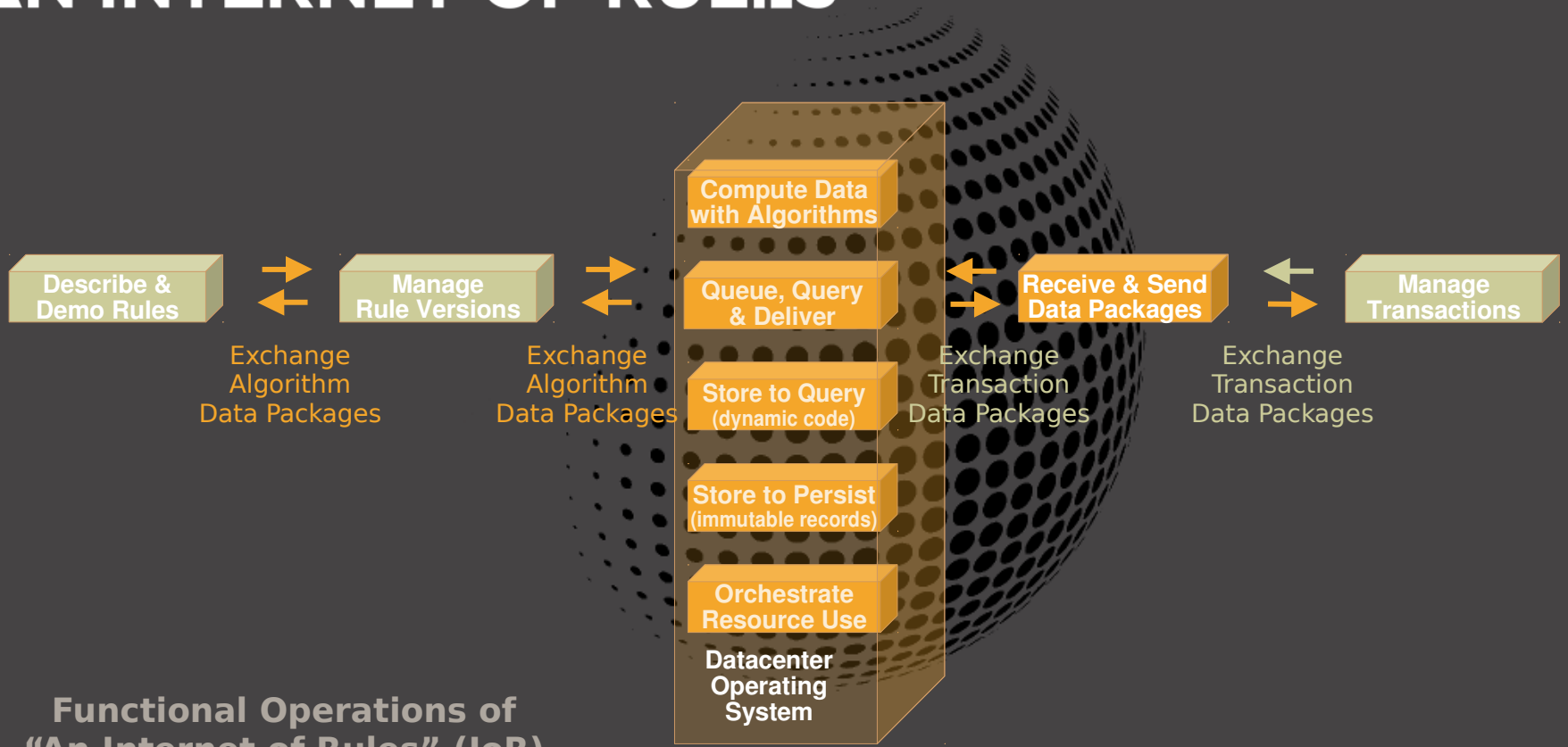
LICHEN

connector
xml data exchange

any
commerce
or **payment**
solution

XALGORITHMS Foundation

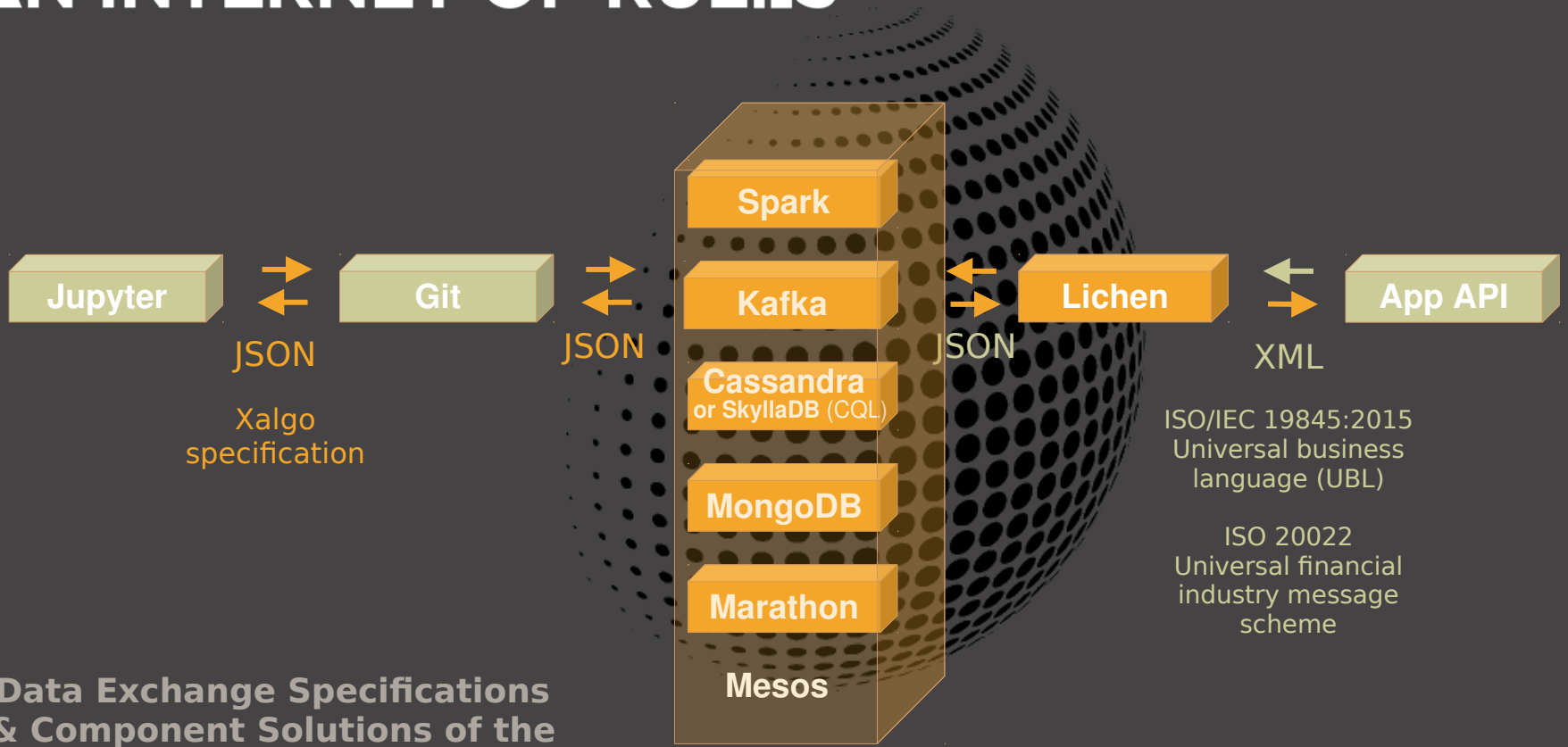
AN INTERNET OF RULES



Functional Operations of "An Internet of Rules" (IoR)

XALGORITHMS Foundation

AN INTERNET OF RULES



Data Exchange Specifications & Component Solutions of the Current IoR Deployment as of January 2018

XALGORITHMS Foundation

How to Automate Legislation

Part 2: Mobilize a Regulation

XALGORITHMS Foundation

How to Automate Legislation

“Xalgo” enables open standard rule expression

- A **method** for expressing declarative relations in contracts, standards, legislation, regulations, control systems, i.e. an open platform-agnostic way to express "the rules".
- Authoring application
- Expression specification
- Registry for rule ID and versioning

XALGORITHMS Foundation

How to Automate Legislation

Let’s step through a real tax example:

Revenue Quebec: “Regulation respecting the application of the Fuel Tax Act”, Section 2R3(a)

Incremental lump-sum reductions on the gas tax payable per litre on the retail sale of automotive fuels, based upon proximity to the Ontario and New Brunswick borders.

T-1, r. 1 - Règlement d'application de la Loi concernant la taxe sur les carburants

Table des matières | Loi habilitante 1

Texte complet

À jour au 1er avril 2017
Ce document a valeur officielle.

chapitre T-1, r. 1

Règlement d'application de la Loi concernant la taxe sur les carburants

Loi concernant la taxe sur les carburants
(chapitre T-1)

2R3. Lorsqu'une personne acquiert de l'essence d'un vendeur en détail qui exploite un établissement de distribution de carburant situé dans une région frontalière qui est limitrophe et contiguë avec:

a) le Nouveau-Brunswick ou l'Ontario, la taxe prévue au paragraphe *a* du premier alinéa de l'article 2 de la Loi est réduite, pour chaque litre d'essence:

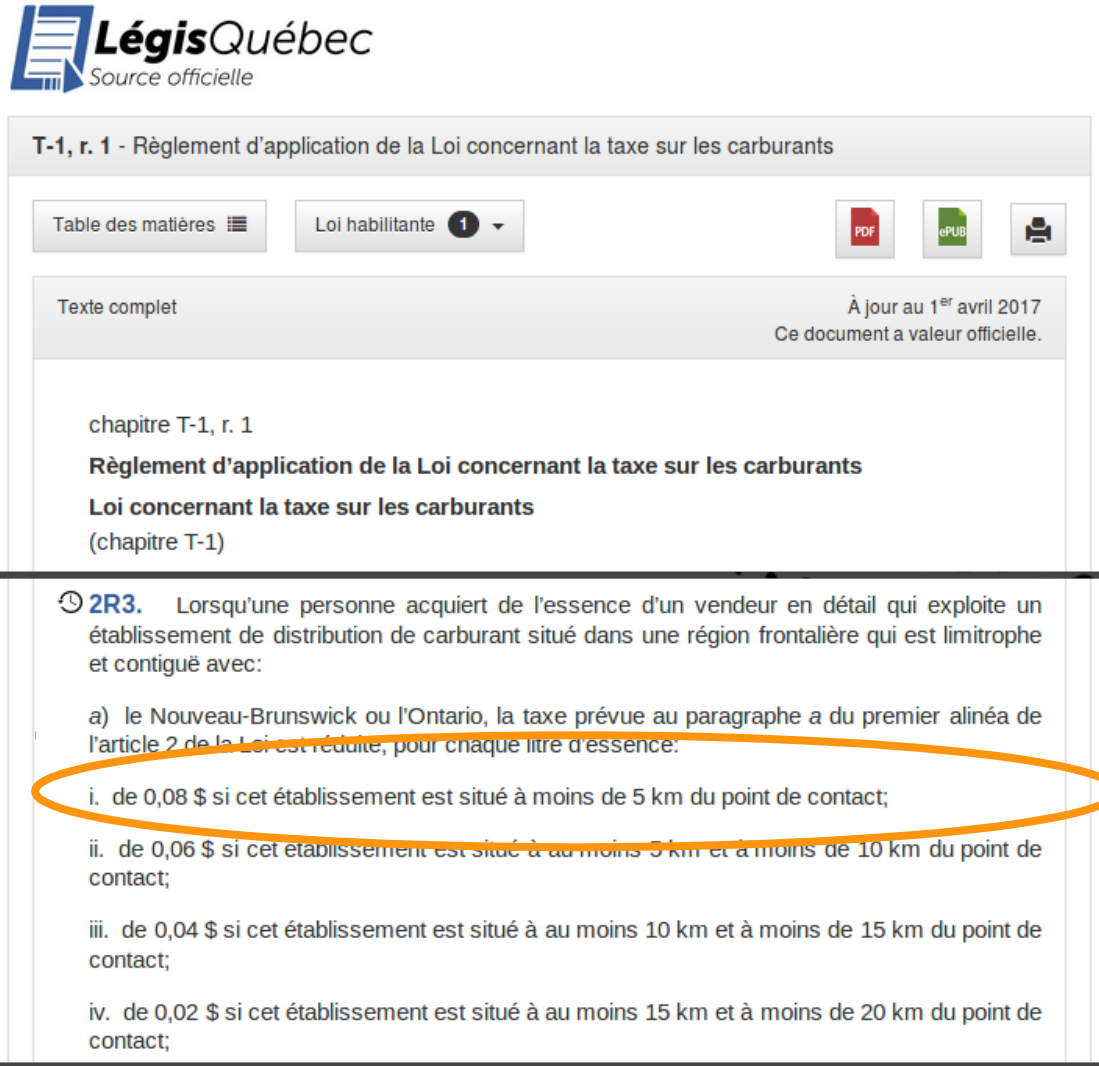
i. de 0,08 $ si cet établissement est situé à moins de 5 km du point de contact;

ii. de 0,06 $ si cet établissement est situé à au moins 5 km et à moins de 10 km du point de contact;

iii. de 0,04 $ si cet établissement est situé à au moins 10 km et à moins de 15 km du point de contact;

iv. de 0,02 $ si cet établissement est situé à au moins 15 km et à moins de 20 km du point de contact;

Example: Section 2R3(a) of the "Regulation respecting the application of the Fuel Tax Act" (chapter T-1, r. 1). Ministry of Justice, Québec (MJQ). Source: Consolidated Regulations of Québec (RLRQ). Website "LégisQuébec". http://legisquebec.gouv.qc.ca/fr/ShowDoc/cr/T-1,%20r.%201



Example: Section 2R3(a) of the "Regulation respecting the application of the Fuel Tax Act" (chapter T-1, r. 1).

2R3. Where a person acquires gasoline from a retail dealer who operates a fuel distribution establishment located within a border region that is bordering and adjoining ... Ontario, the tax provided for .... shall be reduced by (i) $0.08 per litre of gasoline if the establishment is located less than 5 km from the point of contact;

T-1, r. 1 - Règlement d'application de la Loi concernant la taxe sur les carburants

Table des matières | Loi habilitante 1

Texte complet

À jour au 1er avril 2017
Ce document a valeur officielle.

chapitre T-1, r. 1

Règlement d'application de la Loi concernant la taxe sur les carburants

Loi concernant la taxe sur les carburants
(chapitre T-1)

2R3. Lorsqu'une personne acquiert de l'essence d'un vendeur en détail qui exploite un établissement de distribution de carburant situé dans une région frontalière qui est limitrophe et contiguë avec:

a) le Nouveau-Brunswick ou l'Ontario, la taxe prévue au paragraphe *a* du premier alinéa de l'article 2 de la Loi est réduite, pour chaque litre d'essence:

i. de 0,08 $ si cet établissement est situé à moins de 5 km du point de contact;

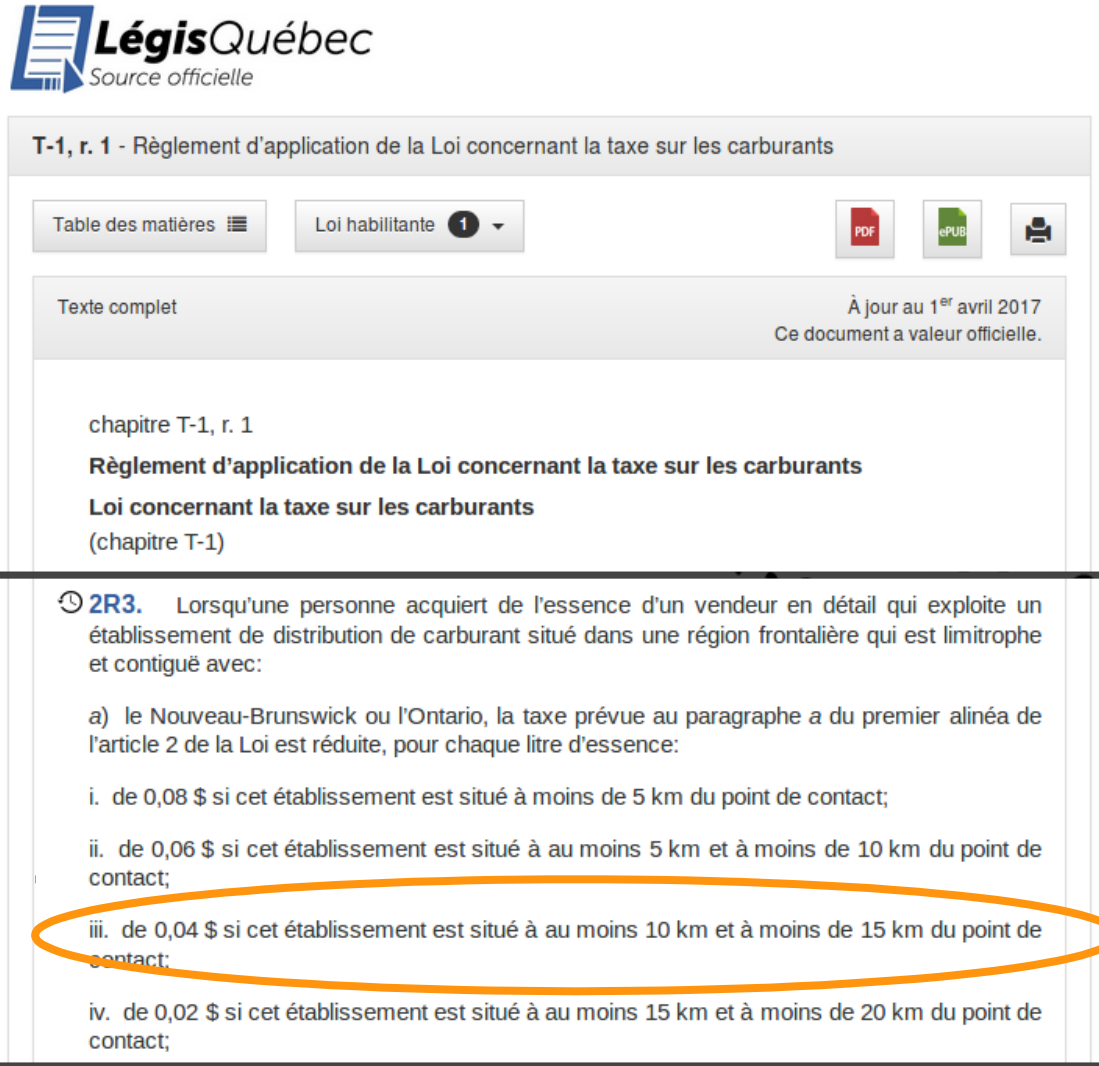
ii. de 0,06 $ si cet établissement est situé à au moins 5 km et à moins de 10 km du point de contact;

iii. de 0,04 $ si cet établissement est situé à au moins 10 km et à moins de 15 km du point de contact;

iv. de 0,02 $ si cet établissement est situé à au moins 15 km et à moins de 20 km du point de contact;

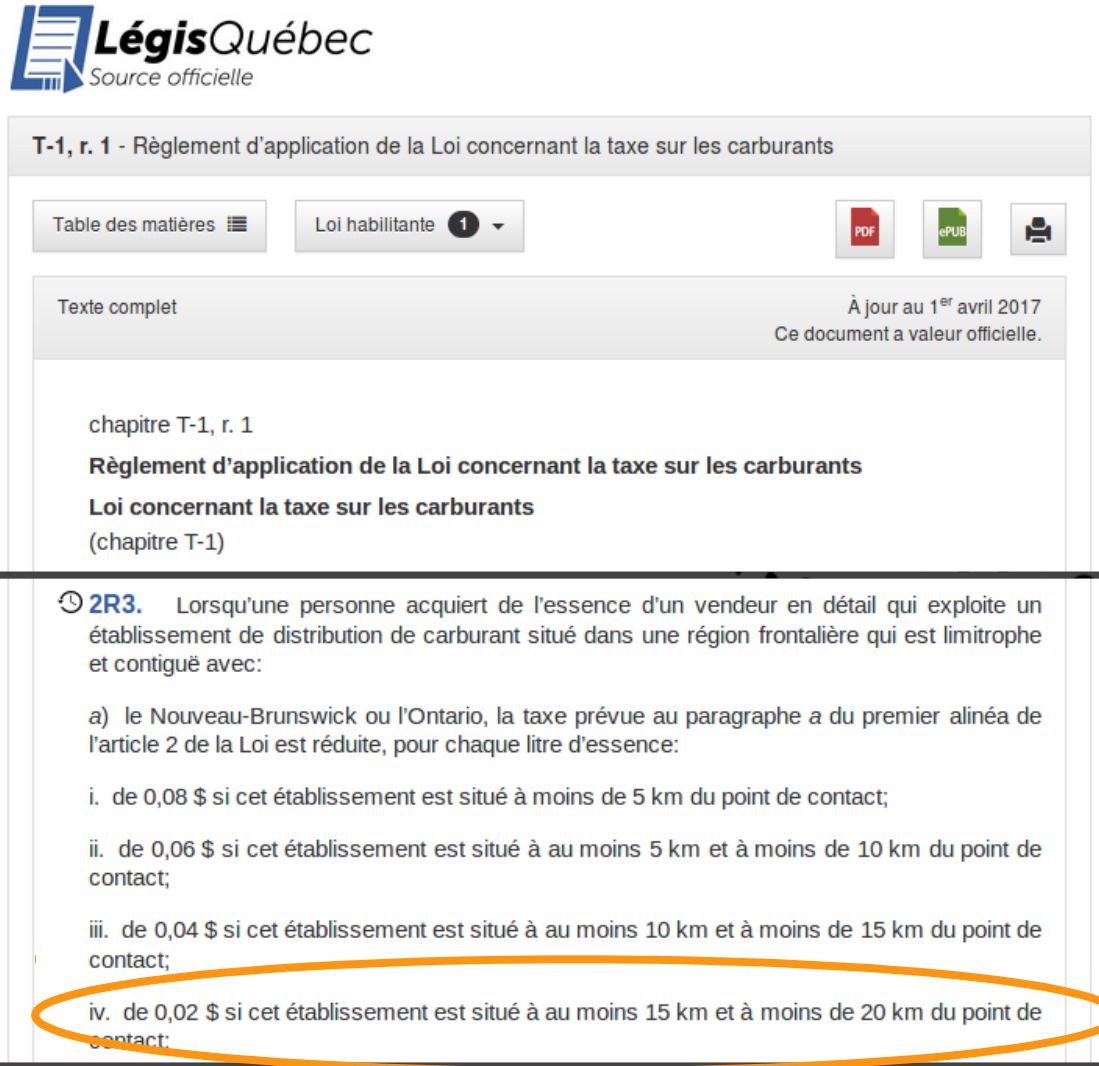
Example: Section 2R3(a) of the "Regulation respecting the application of the Fuel Tax Act" (chapter T-1, r. 1).

2R3. Where a person acquires gasoline from a retail dealer who operates a fuel distribution establishment located within a border region that is bordering and adjoining ... Ontario, the tax provided for .... shall be reduced by (ii) $0.06 per litre of gasoline if the establishment is located at least 5 km and less than 10 km from the point of contact;



Example: Section 2R3(a) of the "Regulation respecting the application of the Fuel Tax Act" (chapter T-1, r. 1).

2R3. Where a person acquires gasoline from a retail dealer who operates a fuel distribution establishment located within a border region that is bordering and adjoining ... Ontario, the tax provided for .... shall be reduced by (iii) $0.04 per litre of gasoline if the establishment is located at least 10 km and less than 15 km from the point of contact;



Example: Section 2R3(a) of the "Regulation respecting the application of the Fuel Tax Act" (chapter T-1, r. 1).

2R3. Where a person acquires gasoline from a retail dealer who operates a fuel distribution establishment located within a border region that is bordering and adjoining ... Ontario, the tax provided for .... shall be reduced by (iv) $0.02 per litre of gasoline if the establishment is located at least 15 km and less than 20 km from the point of contact;

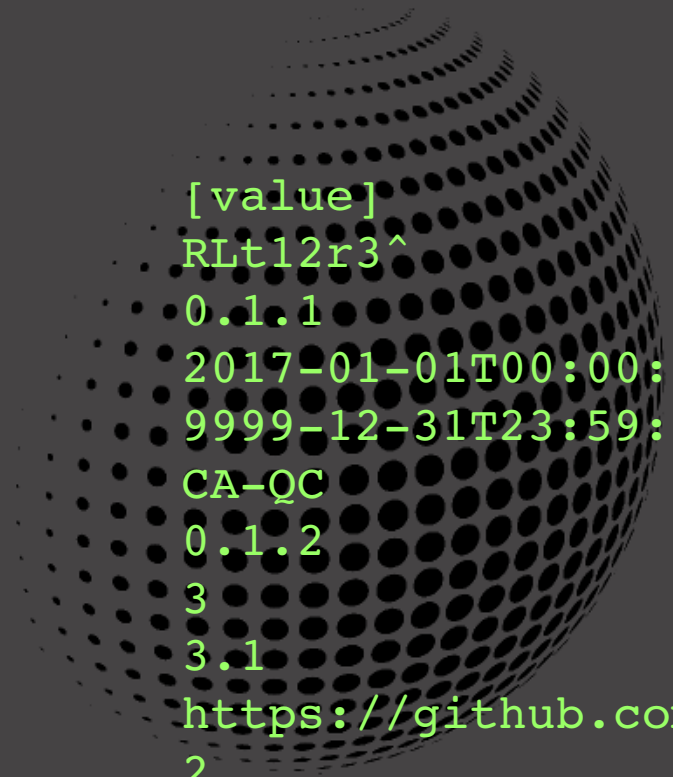
```
<cbns:ID>1234</cbns:ID>
<cbns:IssueDate>2017-05-12</cbns:IssueDate>
-<cans:AccountingSupplierParty>
 -<cans:Party>
  -<cans:PartyIdentification>
     <cbns:ID schemeName="PBN">887603799PG0001</cbns:ID>
   </cans:PartyIdentification>
  -<cans:PartyIdentification>
     <cbns:ID schemeName="ISIC">4730</cbns:ID>
   </cans:PartyIdentification>
  -<cans:PartyIdentification>
     <cbns:ID schemeName="ISIC-NAME">Retail Sale of Automotive Fuel</cbns:ID>
   </cans:PartyIdentification>
  -<cans:PartyIdentification>
     <cbns:ID>123</cbns:ID>
   </cans:PartyIdentification>
  -<cans:PartyName>
     <cbns:Name>l'Essence Chez Bob</cbns:Name>
   </cans:PartyName>
  -<cans:PhysicalLocation>
     <cbns:ID schemeURI="http://openlocationcode.org">87Q6C47F+J7</cbns:ID>
   </cans:PhysicalLocation>
```

REAL-TIME DATA FROM AN IN-PROGRESS PURCHASE

Industry code for retail fuel vendors

Industry group name

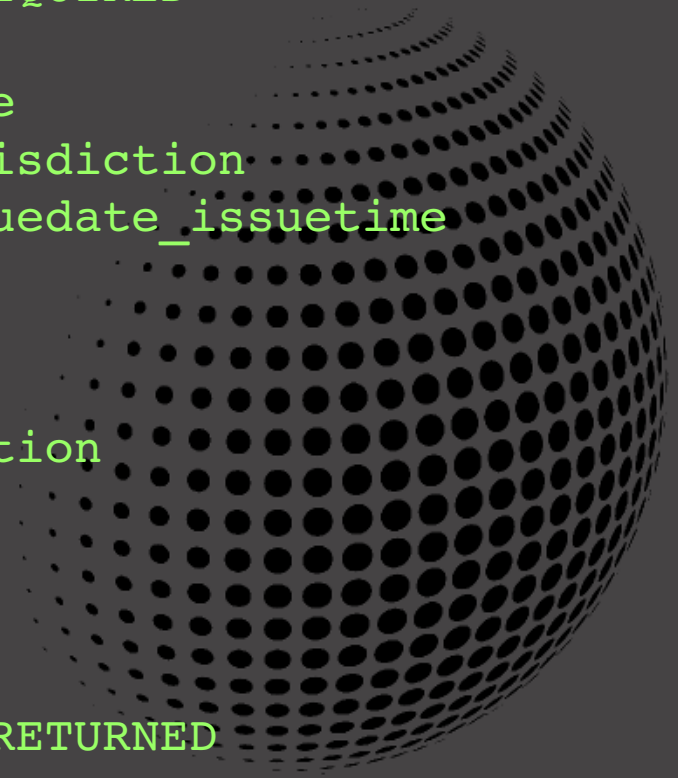
Vendor name



```
// ABOUT THIS RULE
[field_name]                [value]
rule_id                     RLt12r3^
rule_version                0.1.1
rule_starts                 2017-01-01T00:00:00+00:01
rule_ends                   9999-12-31T23:59:59+99:99
rule_jurisdiction           CA-QC
xalgo_version               0.1.2
rule_criticality            3
xqueryversion               3.1
rule_code_url               https://github.com/Xalgorithms...
num_languages               2
```

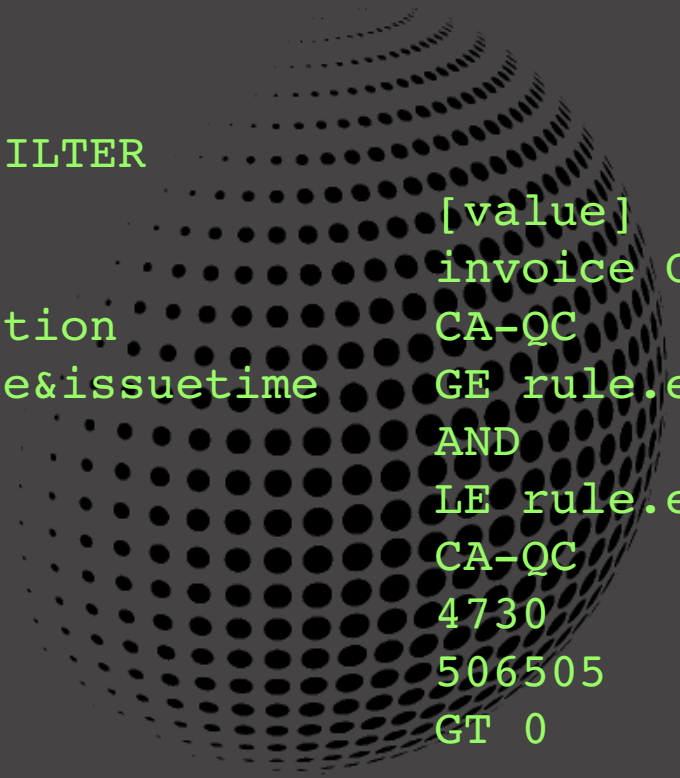
INPUT & OUTPUT DATA

```
// INPUT DATA REQUIRED
[field_name]
transaction_type
transaction_jurisdiction
transaction_issuedate_issuetime
seller_id
seller_province
seller_industry
item_classification
item_price_v1.0
item_quantity
item_unit

// OUTPUT DATA RETURNED
[field_name]
item_price_v1.1
item_price.quantity_v1.1
```



XALGORITHMS Foundation

```
// PROGRAMMER ROLES
[field_name]        [value]
manager_name        Joseph Potvin
manager_email       jpotvin@xalgorithms.org
manager_url         http://www.xalgorithms.org/contact
manager_git-id      jpotvin

author_name         Don Kelly
author_email        karfai@gmail.com
author_url
author_git-id       karfai

committer_name      Hayk Pilosyan
committer_email     haykp@aobyte.com
committer_url
committer_git-id    hpilosyan
```



```
// INPUT VALUES TO FILTER
[field_name]                          [value]
transaction_type                      invoice OR purchase_order
transaction_jurisdiction              CA-QC
transaction_issuedate&issuetime       GE rule.effective.starts
                                      AND
                                      LE rule.effective.ends

seller_province                       CA-QC
seller_industry                       4730
item_classification                   506505
item_quantity                         GT 0
```

ACTIONS

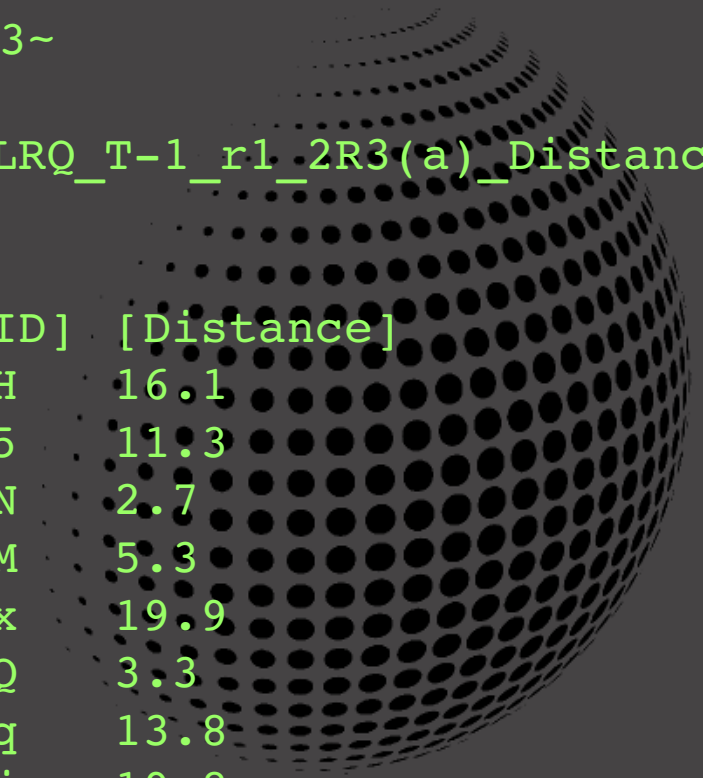
```
// ACTIONS TO PERFORM
[action]
        [input_key]
             [table_id]
                  [selection_criteria]
                       [output_value]
                            [found?]
                                 [condition_code]
table_lookup
        transaction.party.seller.id
             TLt12r3~
                  seller.id EQ EffectiveUserID
                       distance
                            N/Y                    // If found? = "N" and condition_code = 0,
table_lookup                                       terminate action with message xxx
        distance
             TLt12r3-
                  distance LE 2R3(a)_Distance
                       Reduction
                            N/Y                    // If condition_code NE 0,
                                                   terminate action with message yyy

compute Price_new = Price - reduction                  Price_new
compute PriceExtension_new = price_new * quantity      PriceExtension_new
```

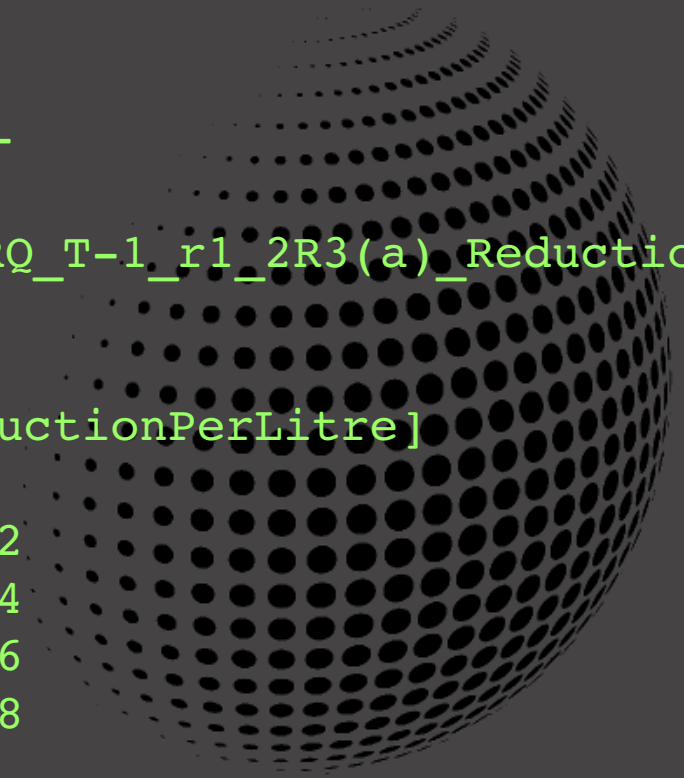
table_idTLt12r3~

// CA-QC_MJQ_RLRQ_T-1_r1_2R3(a)_DistanceRegister

// VALUES

[EffectiveUserID]	[Distance]
us5uQgVJD5UFOQH	16.1
QRpOeZ7UXni9In5	11.3
54JGpXKSaSOjQVN	2.7
earqiEh6gbxf1mM	5.3
T9XxzFbpxvBEzRx	19.9
XapDFDwg0w6taRQ	3.3
Y9Rrpsi9t4zaAEq	13.8
kUlkUY3JzpyHKEj	19.8
fScl51V5VE0ZBpE	1.3
cuzXbCvmQruHaD4	16.6





```
table_id TLt12r3-

// CA-QC_MJQ_RLRQ_T-1_r1_2R3(a)_ReductionPerLitre

// VALUES
[Distance]  [ReductionPerLitre]
20          0
15          -0.02
10          -0.04
5           -0.06
0           -0.08
```

MULTILINGUAL

```
// LANGUAGE SEGMENT 1 (MANDATORY - language of rule jurisdiction)

[field_name]              [value]
language-name             fra     // ISO639-2 code
rule_name                 Québec, Loi de la taxe sur les
                          carburants, réduction fiscale
                          de la région frontalière, détail
documentation_url         http://legisquebec.gouv.qc.ca/
                          fr/ShowDoc/cr/T-1,%20r.%201

// LANGUAGE SEGMENT 2
[field_name]              [value]
language-name             eng     // ISO639-2_code
rule_name                 Quebec, Fuel Tax Act, Border Region
                          Tax Reduction, Retail
documentation_url         http://legisquebec.gouv.qc.ca/en/
                          ShowDoc/cr/T-1,%20r.%201
```

<cbns:BaseUnitMeasure unitCode="LTR">1</cbns:BaseUnitMeasure>
<cbns:PerUnitAmount currencyID="CAD">-0.04</cbns:PerUnitAmount>
<cans:TaxCategory>
<cans:TaxScheme>
<cbns:ID>QUEBEC_BORDER_GAS_TAX_REDUCTION</cbns:ID>
<cbns:Name>Québec Border Gas Tax Reduction</cbns:Name>
</cans:TaxScheme>
</cans:TaxCategory>
</cans:TaxSubtotal>
</cans:TaxTotal>
<cans:Item>
<cbns:Description>Regular Gas</cbns:Description>
<cans:CommodityClassification>
<cbns:ItemClassificationCode listName="UNSPSC">506505</cbns:ItemClassificationCode>
</cans:CommodityClassification>
<cans:AdditionalItemProperty>
<cbns:ID>UNSPSC-NAME</cbns:ID>
<cbns:Name languageID="EN">Gasoline and Petrol</cbns:Name>
</cans:AdditionalItemProperty>
</cans:Item>
<cans:Price>
<cbns:PriceAmount currencyID="CAD">1.00</cbns:PriceAmount>
<cbns:BaseQuantity unitCode="LTR">1</cbns:BaseQuantity>
</cans:Price>

Tax Reduction

Rule name

DATA RETURNED
IN XML (UBL SCHEMA)
AFTER RULE EXECUTION

Product group name

/Users/admin/s/companies/Xalgorithms/20170508-Meeting/GasTaxExample
Input.xml, Top line: 1

```
<?xml·version="1.0"·encoding="UTF-8"?>
<!--2017-05-14·11:30z·GasTaxExample·input·values-->
<inns:Invoice·
xmlns:inns="urn:oasis:names:specification:ubl:schema:x
xmlns:cans="urn:oasis:names:specification:ubl:schema:x
xmlns:cbns="urn:oasis:names:specification:ubl:schema:x
```

BEFORE & AFTER VIEWS

```
··<cbns:ID>1234</cbns:ID>
··<cbns:IssueDate>2017-05-12</cbns:IssueDate>
··<cans:AccountingSupplierParty>
····<cans:Party>
·····<cans:PartyIdentification>
·····<cbns:ID·schemeName="PBN">887603799PG0001</cbn
·····</cans:PartyIdentification>
```

```
·····<cans:PartyName>
·····<cbns:Name>l'Essence·Chez·Bob</cbns:Name>
·····</cans:PartyName>
·····<cans:PhysicalLocation>
·····<cbns:ID·schemeURI="http://openlocationcode.or
·····</cans:PhysicalLocation>
```

/Users/admin/s/companies/Xalgorithms/20170508-Meeting/GasTaxExample
Return.xml, Top line: 1

```
<?xml·version="1.0"·encoding="UTF-8"?>
<!--2017-05-14·11:30z·GasTaxExample·return·values-->
<inns:Invoice·
xmlns:inns="urn:oasis:names:specification:ubl:schema:x
xmlns:cans="urn:oasis:names:specification:ubl:schema:x
xmlns:cbns="urn:oasis:names:specification:ubl:schema:x
xmlns:exns="urn:oasis:names:specification:ubl:schema:x
··<exns:UBLExtensions>
····<exns:UBLExtension>
·····<exns:ExtensionAgencyName>Internet·of·Rules</exn
·····<exns:ExtensionReason·languageID="en"
>Report·of·the·list·of·rules·having·been·applied·to·th
·····<exns:ExtensionContent>
·····<ior:Record·xmlns:ior="http://internetofrules.
2017-05-14·11:30z
Rules·applied:
····CANADA GST
····QUEBEC QST
····QUEBEC BORDER GAS TAX REDUCTION
·····(Ref:·http://legisquebec.gouv.qc.ca/fr/ShowDoc
····TAX TOTAL
</ior:Record>
·····</exns:ExtensionContent>
····</exns:UBLExtension>
··</exns:UBLExtensions>
··<cbns:ID>1234</cbns:ID>
··<cbns:IssueDate>2017-05-12</cbns:IssueDate>
··<cans:AccountingSupplierParty>
····<cans:Party>
·····<cans:PartyIdentification>
·····<cbns:ID·schemeName="PBN">887603799PG0001</cbn
·····</cans:PartyIdentification>
·····<cans:PartyIdentification>
·····<cbns:ID·schemeName="ISIC">4730</cbns:ID>
·····</cans:PartyIdentification>
·····<cans:PartyIdentification>
·····<cbns:ID·schemeName="ISIC-NAME">Retail·Sale·of
·····</cans:PartyIdentification>
·····<cans:PartyIdentification>
·····<cbns:ID>123</cbns:ID>
·····</cans:PartyIdentification>
·····<cans:PartyName>
·····<cbns:Name>l'Essence·Chez·Bob</cbns:Name>
·····</cans:PartyName>
·····<cans:PhysicalLocation>
·····<cbns:ID·schemeURI="http://openlocationcode.or
·····</cans:PhysicalLocation>
```


How to Automate Legislation
Part 3: Simplicity, Fairness, Autonomy, Interoperability, Consistency, Convenience, Neutrality, Reliability, Popularity
XALGORITHMS Foundation

Smartphone

Desktop

In-Store

Voice

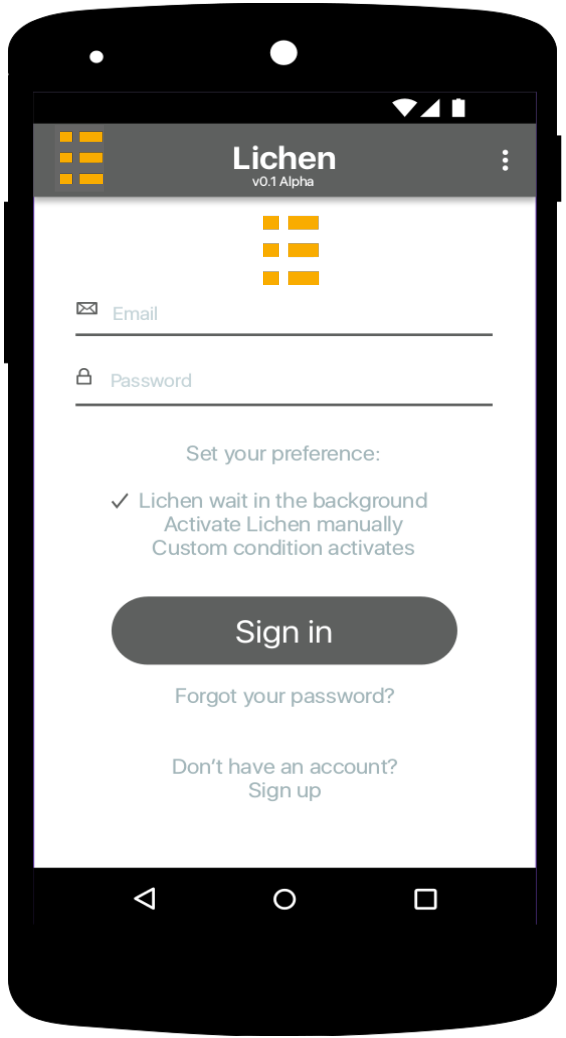
Text

XALGORITHMS Foundation

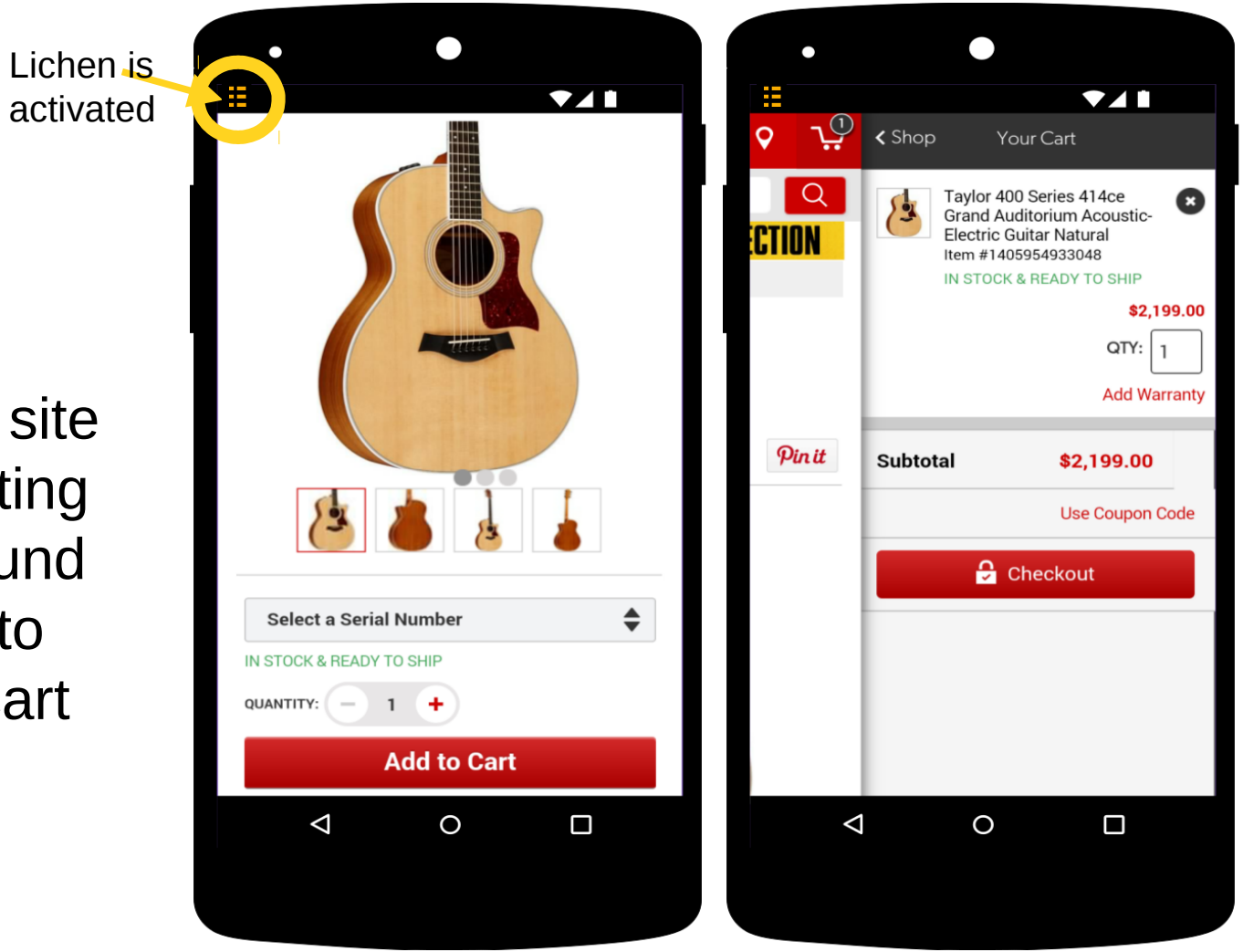
Activate Lichen

User preferences:

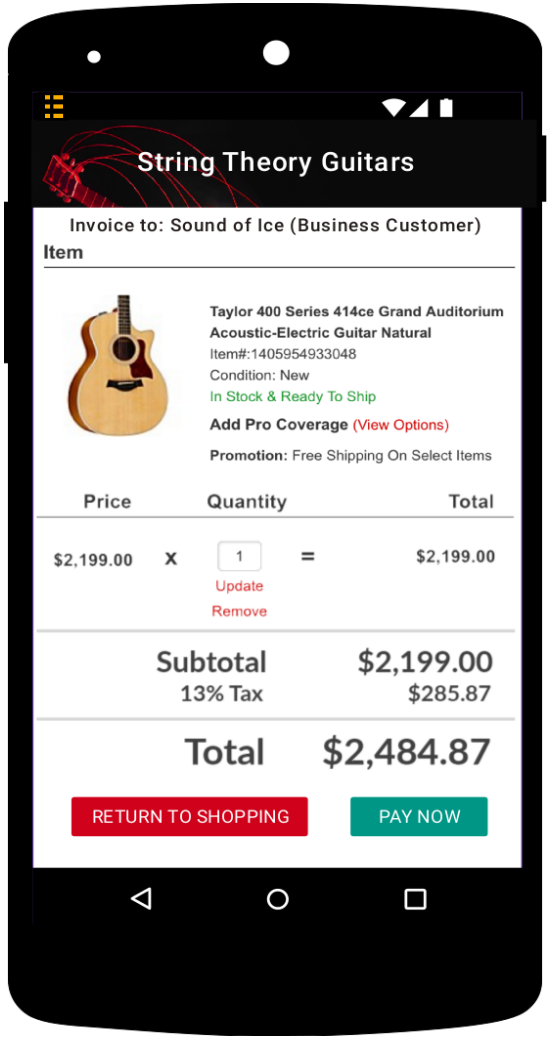
- “Lichen waits in background”
- “Activate Lichen manually”
- “Activate by custom condition”



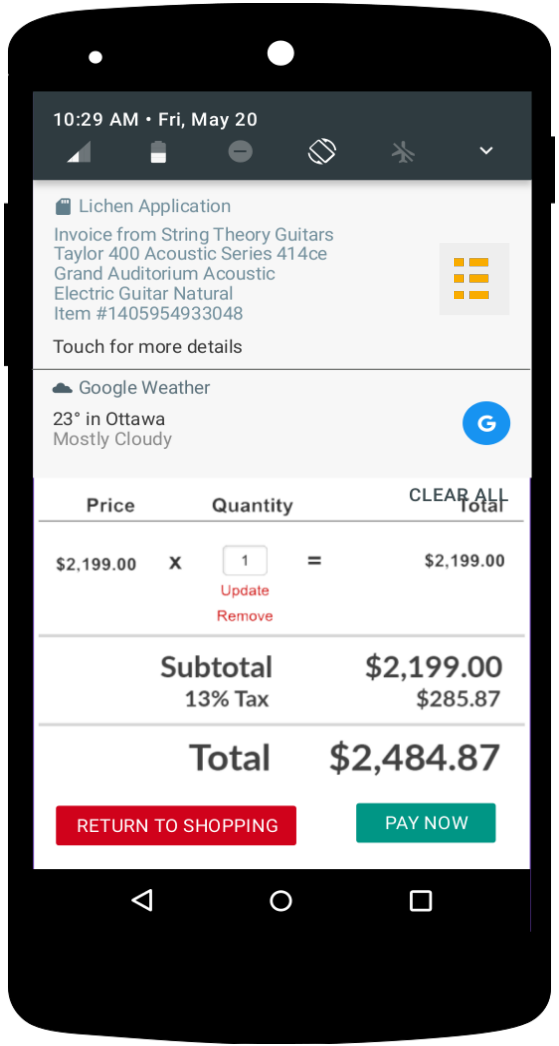
- Proceed to commerce site
- Lichen waiting in background
- Add items to shopping cart



- Purchase order or invoice from a commerce site
- Lichen detects that an active purchase order or invoice is being displayed
- The user’s permission has been given for Lichen to use some essential data to find applicable rules



- Lichen issues a notification if it finds a rule that applies to the transaction
- User pulls down notifications
- Notifications drop down overtop of the purchase order or invoice
- User touches the Lichen notice to open it



Consumers

Citizens

XALGORITHMS Foundation

Supply Chains

XALGORITHMS Foundation

Benefits of Automating Legislation

XALGORITHMS Foundation

Benefits of Automating Legislation

BUSINESS

End-to-end value-chain interactions are simplified
Businesses get streamlined import and export processing
Reduced administrative burden of tax/tariff updates as changes and notifications can deploy automatically
Businesses of all sizes can more easily automate bookkeeping and net tax/tariff payable (e.g. GST payable)
Major reduction in administrative costs of compliance and enforcement, for both government and business

Benefits of Automating Legislation

GOVERNANCE

A highly valuable fiscal policy “information feedback loop”

Since changes and notifications deploy automatically...

And since Lichen generates real-time data that enables to track the effects of taxes, tariffs, exemptions, credits, reductions, zero-rating criteria...

Therefore fiscal policy intent can be more readily monitored, enabling corrections or enhancements to be much better targeted and/or much more timely

XALGORITHMS Foundation

Benefits of Automating Legislation

STRATEGIC

Canada can be at the forefront of standardizing the automation of legislation for the global “Trade 3.0” shift

“I skate to where the puck is going to be, not where it has been.” ~ Wayne Gretzky

Canadians can have greater confidence that everyone is paying their fair share due to more universal compliance

A tangible contribution to a more competitive Canada

XALGORITHMS Foundation

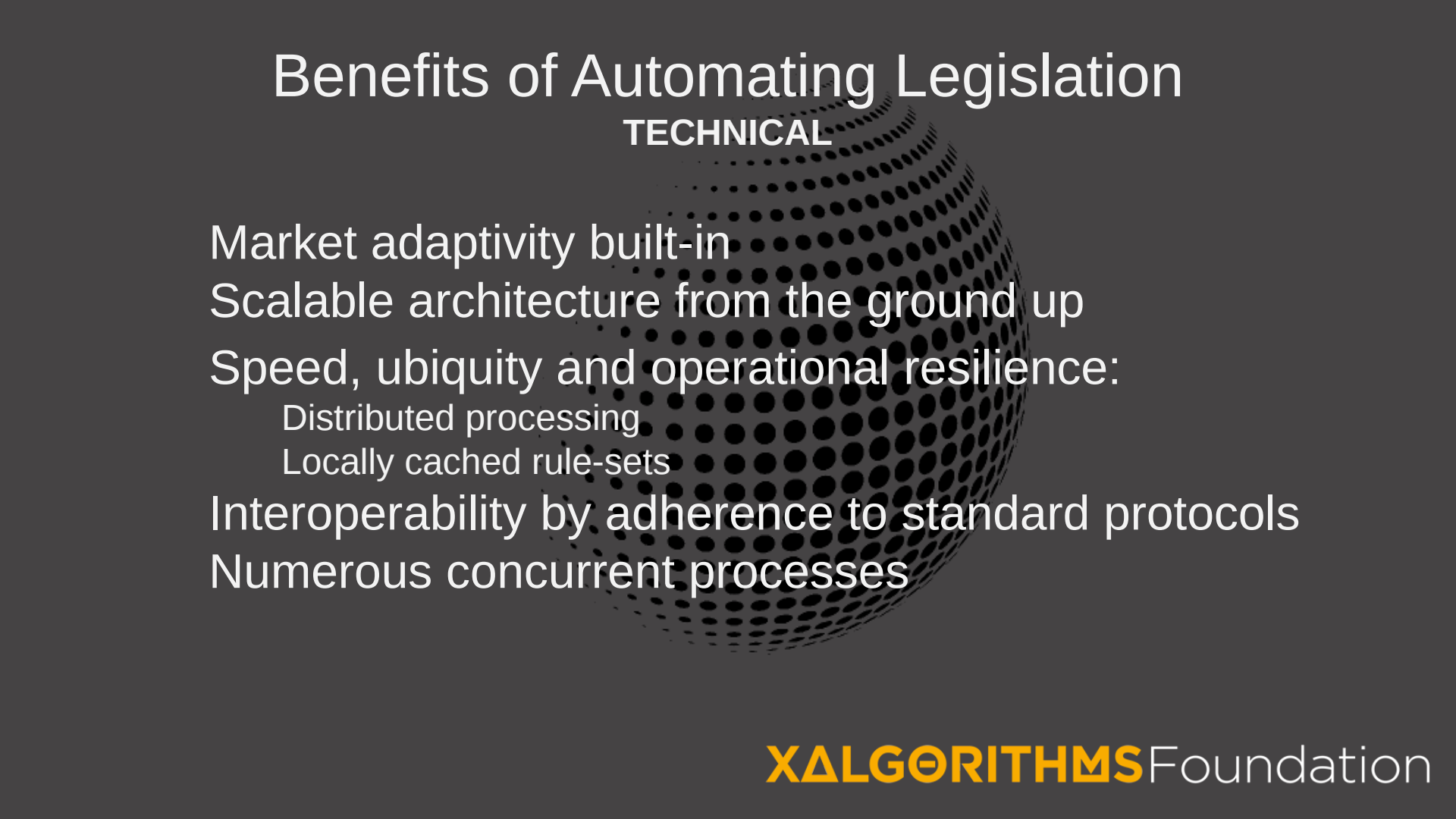
Benefits of Automating Legislation

STRATEGIC

	GLOBAL TRADE 1.0	GLOBAL TRADE 2.0 →	GLOBAL TRADE 3.0
MEDIA	Ink & Pulp-Based Paper	Digital “Paper” HTML, PDF	Executable Components
CODIFICATION	Natural languages	Natural languages	Algorithms, XML, Data
COMMUNICATION	Published Guide, Forms	Digitized Guides, Forms	Automated, Transparent
COMPLIANCE	Costly, Difficult	Less Costly, Difficult	Automated, Transparent
INCLUSIVENESS	Capability-Dependent	Capability-Dependent	Ubiquitous
CONSISTENCY	Low: Diverse	Moderate: Single Window	High: Interoperable

Benefits of Automating Legislation

TECHNICAL



- Market adaptivity built-in
- Scalable architecture from the ground up
- Speed, ubiquity and operational resilience:
  - Distributed processing
  - Locally cached rule-sets
- Interoperability by adherence to standard protocols
- Numerous concurrent processes

XALGORITHMS Foundation

What is the Next Step?

XALGORITHMS Foundation

What is the Next Step?

1. Foster a free/libre/open source initiative for automating the computational rules in the public sector

- Applied legal R&D on including executable code in schedules to legislation
  - Federal-provincial/state-territorial collaboration
  - Globally via UNCITRAL, ITC & World Bank collaboration
- Non-partisan (i.e. seek all-party commitment)
- Multi-sectoral (industry, academia, civil society)
- Gov. participation in data standards bodies and free/libre/open communities
  - OASIS, ISO, IEC, ITU, W3C, IETF, UNSO, IFAC
  - Explicitly engage the “Internet of Rules” and “4-Corner” approaches in order to leapfrog Trade 2.0, and go straight to Trade 3.0
  - CETA: Engage & strengthen the PEPPOL community undertaking

XALGORITHMS Foundation

What is the Next Step?

2. Adopt an “Intellectual Resources” Focus

- Cultivate an understanding of “intellectual resources” management
- Establish a dedicated autonomous arms-length agency reporting to the Minister for Innovation
- Provide for a partial delegation of authority to the head of IT services to support free/libre/open collaboration by any part of government
- Give this entity explicit liaisons with for federal/provincial/state relations, international partners, standards bodies
- Authorize this entity to participate directly in creation of an “Internet of Rules” running on an a distributed data fabric

XALGORITHMS Foundation

Thank you!

Discussion

www.xalgorithms.org

Contact: Joseph Potvin <jpotvin@xalgorithms.org>

XALGORITHMS Foundation